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ABSTRACT

In a 1973 Smithsonian behavioral science project, observational methods were used to record school group behaviors during docent guided tours in the National Museum of History and Technology. The purpose of this exploratory study was to reveal the natural museum habitat and criterion behaviors of visiting fourth through sixth graders. Children's responses were characteristic of four categories--orientation, verification, discovery, and integration--which were found to vary in different museum settings. The four categories were sufficiently described to further the development of a standard which could be used to judge the quality of a tour experience, to understand better the nature of children's experiences in different museum settings, and to apply them to docent training for which three proposed studies are described. Recommendations for changes in the Pharmacy Tour also resulted from this study. This report of the study contains an appendix with samples of observation, instruments, settings, data and logic employed to gather the results described, and an appendix of designs for future studies. (Author/JH)

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THE MUSEUM STRUCTURED GROUP EXPERIENCE

AN OBSERVATIONAL STUDY OF CRITERION BEHAVIORS

AND RECOMMENDATIONS FOR APPLICATION

Jean Chen

March 1974

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Jean Chen
Smithsonian Institution

In a 1973 Smithsonian behavioral science project, observational methods were used to record school group behaviors during docent guided tours in the National Museum of History and Technology. Systematic observational methods were chosen to describe behaviors and its context with fullness beyond that offered by statistics generated from psychological tests. One purpose of this exploratory study was to reveal the natural museum habitat and criterion behaviors of visiting fourth through sixth graders.

Examination of the data led to the formation of four interpretive categories of criterion behavior. Children's responses were characterized by these categories: orientation, verification, discovery and integration (O, V, D and I). It was found that the incidence of O, V, D and I varied in different museum settings. Contrasts in group behaviors occurred in the transition from the rectangular room to the museum period rooms. These findings were examined and reported.

It was concluded that the four interpretive categories were well enough described to enable further testing and application. The Psychological and Sociological Studies Program was concerned with the development of a standard which could be used to judge the quality of a tour experience or understand better the nature of children's experiences in different museum settings. Recommendations for changes in the Pharmacy Tour which are immediately practicable also resulted from this study. More far reaching change is suggested through exploratory application of these categories to docent training. A specific study to design docent communications techniques by probing integration and concept formation is proposed. Two other studies concerned with group management of time, events and activities in the museum are also suggested for future study.

TABLE OF CONTENTS

I. Introduction 1

II. Method 3

A. The Observational Method 4
B. Procedure for Data Collection 5
C. Tour Characteristics 6

III. Results 9

IV. Discussion 12
A. An Explanation of the Tour Experience Using the Criterion Behavior Categories 12
B. Interpretation of Results 17

V. Conclusion 27
A. Suggestions for Future Study 28
1. The development of interface techniques: A study of integration 28
2. A study to sequence O, V, D, & I 33
3. A study using introspective docents 36
B. Budget and Equipment Needs 39

VI. References 40

VII. Appendices 42
Appendix A - Instruments and Data
1. Photographs of the Pharmaceutical History Tour
2. Tour objectives
3. Floor plan of Hall of Pharmaceutical History, National Museum of History and Technology
4. Observation coding sheets and attachment manual
5. A sample of responses grouped in criterion behavior categories
6. Charts
7. Information dissemination

Appendix B - Designs for a Future Study
1. Pre and post test display case unit
2. A research information station

INTRODUCTION

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Tour Quality

Museums have long been responsive to the public demand for educational programs. And now museum professionals are looking for ways to improve the quality of tour experiences. The Psychological and Sociological Studies Program of the Office of Museum Programs undertook an observational study of group behaviors in 1973 in order to consider two needs central to the search for quality.

In light of a need for modern training programs which prepare docents to serve school groups,[1] it was felt that behavioral research into the tour process could assist in developing a docent's management skill and instructional ingenuity to make a museum visit more meaningful to children.

Second, in order to capture the quality of the tour experience in various museum settings, it was necessary to develop an investigative tool. The idea of using criterion behaviors was introduced as a step in developing research tools. An observational method was used to isolate and describe four interpretive categories for the criterion behaviors: orientation, verification, discovery, and integration. Establishment and definition of these categories could serve as a future standard upon which judgments or decisions concerning tour programs may be based. For example, this standard could be used to design docent techniques which fully exploit exhibit content. Further, the corroboration of these four categories would establish a basis for classifying additional criterion behaviors.

The study demonstrates the use of a social science to assess change in behaviors, record behaviors and describe conditions which affect criterion behaviors during a museum tour. Pragmatic analysis of the resulting information would be useful to directors, curators, designers, and audio-visual planners who seek to affect the visitor through: (1) visual and written exhibit materials and artifacts, (2) docents, (3) exhibition use of space

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[1]Katherine J. Goldman, ed., Opportunities for Extending Museum Contributions to Pre-college Science Education (Washington, D. C.: Smithsonian Institution, [1970]), p. 18.

Frank Taylor, former Director General of Museums at the Smithsonian Institution and Director of the U.S. National Museum concludes, "...time, money, personnel and thought would be better spent on attacking the problems of space, communication with visitors, and accommodation of school classes--problems which are already known..."

and environment (composition of light, sound, movement, etc.), or (4) organizational systems (these might include audio programs, routing maps, or review stations).

Categories of Criterion Behaviors - The criterion behaviors provide a standard for judging the effect of museum programs on the young visitor. Observable responses (behaviors) of children have been interpreted as falling into four basic categories: orientation, verification, discovery and integration. Each category describes a dimension of the child's museum experience. These categories were initially formulated by Dr. Ross J. Loomis [2] to assist in the search for a set of criterion behaviors that accurately represent the child's experience.

Orientation - One valuable learning experience in the museum is the way a visitor conceptualizes a particular problem or field of knowledge.[3] The museum tour may help the visitor think of the proper questions to ask or stimulate him to view certain events of history, art, or technology from a new or more comprehensive perspective. An examination of this behavior may offer an insight into the way the visitor initiates his trip through an exhibit and the kinds of early cogent experiences which he encounters as he moves into the exhibit area. These answers are a matter of practical importance in designing the visitor's experience.

Verification - The museum visitor has a unique opportunity to validate the authenticity of an artifact or to confirm a point in history. Having heard about an ancient culture or an artifact, such as a famous airplane, he can explore and understand it. He can validate the existence of an object and become reacquainted with its properties. Verification refers to this basic kind of museum behavior which involves first-hand contact with an artifact as a form of reality and evidence. The study of this behavior may suggest ways in which artifacts can better be displayed to help a visitor conceptualize the multidimensional reality of the object.

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[2]Dr. Ross J. Loomis, Professor of Psychology at Colorado State University, Fort Collins, Colorado.

[3]Adolphe E. Meyer, An Educational History of the American People (New York: McGraw Hill, 1957), p. 239, quoting Herbert Spencer, "Education," Westminster Review (1859). The importance of content was expressed by Spencer, "What matters in education is not so much drill, but the actual content of what was studied." The researcher assumes that children can make better use of exhibit content and ask appropriate questions if given a frame of reference, i.e. a set of ideas or facts. A study of orientation may determine the clarity of different perspectives used to teach tour content.

Discovery - Museums are a place where free and spontaneous discovery of information occurs. As the visitor moves through exhibits, he encounters ideas or new objects that he did not know before. Therefore, discovery is associated with the extension of a person's knowledge. Discovery as a museum behavior is closely related to the information variable of novelty. Artifacts which are consistently eye catching and have high attention getting value may be used to increase discovery. An exhibit can be analyzed in terms of its potential to help visitors process new information. Some of the practical aspects of this concept are, what kinds of displays and exhibit techniques facilitate the experience of error free discovery?

Integration - Another unique value of the museum is the manner in which a visitor is able to pull together and organize objects, concepts, etc. into some kind of coherent experience. Museums may afford opportunities for this kind of integration that are not typically found in printed materials or even audio-visual aids. By being able to see different artifacts of a subject matter displayed in close proximity, the museum visitor may associate those artifacts in a manner not easily done in another setting. At a practical level, integration refers to the way an exhibit is planned to make it possible for the visitor to pick up themes and relate the components of an exhibit to those themes.

METHODS

The establishment of the dimensions and directions of this project began in August 1972. Discussions were held with museum administrators, curators, docents, and educators within and outside the Smithsonian Institution. Proposals were considered and the actual start of observational work began in February 1973. Communication with docents was maintained during the months in which observations were made. Logs were kept February, March, and May 1973. An in-house presentation of the preliminary results was made by Dr. Ross J. Loomis and Ms. Jean Chen at the Smithsonian Institution in July 1973 in order to solicit staff comments.[4]

Interpretation of the preliminary data by professionals is basic to our work method. Dr. Karl Weick of Cornell University was called in to consult with Smithsonian Institution museum professionals. Such meetings combined the knowledge and expertise of several fields. This ground work established the systematic preparation of a foundation of knowledge to support museum research and thought concerning visitor skills, attitudes, needs, and receptivity.

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[4]Subsequent presentations are listed in appendix A6, Information Dissemination.

The Observational Method

This study incorporates social science research methods and demonstrates the advantages of an interdisciplinary, museum-based research team. The use of psychological consultants in adapting observational methods and interpreting subsequent findings represent the contributions of a social science discipline to the development of a new and practical research tool. With the aid of a research psychologist, an observational method was used to study visiting school groups in different museum settings. The specific techniques used in our observational study are based on the work of Karl E. Weick. Weick's term, systematic observational methods means:

> planned, methodical watching that involves constraints to improve accuracy....the term 'observational methods' is often used to refer to hypothesis-free inquiry, looking at events in natural surroundings, non-intervention by the researcher, unselective recording, and avoidance of manipulations in the independent variable....An observational method is defined as the selection, provocation, recording, and encoding of that set of behaviors and settings concerning organisms "in situ" which is consistent with empirical aims.[5]

Weick also describes numerous reasons for using observational methods:

> ...it is necessary to use observation in studies of children because it is difficult for children to introspect and to remain attentive to lengthy adult tasks. Overinvolvement makes it difficult for a subject to report what he is doing. When involved, the person cannot be aware of dimensions of the event that would be apparent to a detached observer... Unawareness of events may also occur because the activities are habitual or...culturally patterned....subjects are an inadequate source of data; when the desired score is not an individual score...when the phenomenon is fleeting and may not be noticed by the subjects; and when the subject's report might be distorted by defensive processes. Observation is frequently necessary because persons do not have the language to describe their actions.[6]

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[5]Karl E. Weick, "Systematic Observational Methods," in The Handbook of Social Psychology, eds: Gardner Lindzey and Elliot Aronson (Reading, Mass.: Addison-Wesley Publishing Co., 1968), vol. 2: Research Methods, pp. 358 and 360. Selection, provocation, recording, and encoding are discussed on page 361.

[6]Ibid., p. 363.

There is another important reason to use observational methods to study young children. Paper and pencil measures of learning and attitudes are inappropriate for young children who lack the necessary verbal and/or reading skills to respond. For these reasons, observational methods provide the best means of studying children in the complex surroundings of the museum.

Procedure for Data Collection

The observational method enabled the observer to move naturally with docent led groups while using simple observational coding sheets to record behavior and its context. Unlike casual visitors whose agenda is not determined by the museum, children with docents worked toward the same goals, went to a pre-selected exhibit area, and discussed artifacts using a conceptual framework designed by the museum staff. The behaviors were recorded as they occurred in four sections of the Medical Health Discovery Experience. Also known as the pharmacy tour, this exercise is conducted in the Hall of Pharmaceutical History in the National Museum of History and Technology.

In the first phase of data collection, the researcher decided to collect data which could provide when assembled a good visual picture of whole events. Only paper, pencil and stopwatch were used to unobtrusively record group responses in chronicle form. Chronicles or descriptive logs (DL) of eight pharmacy tours presented a sequential, narrative account of undissected specimens of behavior and psychological situations. Data from eight logs provided 576 responses from approximately 250 children, which could be compiled for statistical purposes. This data was broadly categorized as:

(1) behavior observed;
(2) number of children involved in specific behavior;
(3) environment in which behavior occurred; and
(4) portion of tour in which behavior occurred.

The researcher grouped the resulting mass of 576 criterion behavior responses into four interpretive categories: orientation, verification, discovery, and integration. Some of the categorized responses appear on appendix A4 and are the basis for charts 1, 2, and 3 in appendix A6.

In preparation for the second phase of data collection, the researcher constructed categories [7] to identify molar [8] aspects of docent and group behavior. The categories were used in an observational coding sheet (a field device which was called a structured log or SL). These categories were used to record responses to the physical setting and to the docent. Data from four tours with approximately 120 children was compiled to produce charts 3, 4 and 5 in appendix A6.

Tour Characteristics

In order to interpret the meaning of the particular behaviors observed, it is important to consider the objectives and the settings of the group tour. Part of the uniqueness of this museum tour was the structure which helped children integrate the visual/design elements of artifacts with ideas, themes, or concepts of an exhibit. Artifacts were used to discuss the contributions of technology to the development of the pharmaceutical trade and health care. Technological concepts such as mass production, standardization, and mechanization were introduced through artifacts.

The one hour docent structured experience is based on established routes, activities, and objectives. Although individual docents were encouraged to develop a personal style of handling the activities, the objectives of the lesson remained constant. Some of the objectives of the discovery lesson in the Hall of Pharmaceutical History,[9] as described by David Estabrook, are:

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[7] Ibid., p. 350. Weick also emphasizes two major techniques which have received the most attention: construction of category and rating scales and observer training. (Also see Heyns and Lippitt, 1951; Heyns and Zander, 1958; Lambert, 1960; Medley and Mitzel, 1963; Wright, 1960). Training focuses on calibrating and sensitizing the experimenter to the flow of events.

[8] Herbert F. Wright, Recording and Analyzing Child Behavior (New York: Harper & Row, 1967), p. 14. Wright states that naturalistic observation is concerned with molar and molecular aspects of behavior and situation. "The molar units (of behavior) are molar in the sense that they occur in the context of the person as a whole and a molar environment....molar behavior has two additional main distinguishing features, both implicit in the idea of action by a person. It is goal directed and it generally occurs within the cognitive field of the person."

[9] The full set of knowledge and skill objectives are in appendix A2.

(1) To know that technology caused many changes in the means of production, the economy, and the lives of the people.

(2) To know that these changes brought both advantages and disadvantages to the individual and his society.

(3) Presented with a historical problem and a practical experiment, students will compare products to conclude that costs would be reduced while quality, quantity, and efficiency would be increased by the machine process.

(4) Given the lesson in pill making and their responses to the historical problem, students will conclude that the many advantages to society produced by technological innovation will far surpass the disadvantages.

(5) Given these conclusions and the brief lesson in mechanics of pill production, students will be able to develop questions concerned with such problems as: overall medical advantages derived from such means of production, where the pills will be produced and who will produce them, needs for regulating production, economic advantages to the pharmacist and how he might utilize time made available by the machine.

(6) Given the brief introductory lesson, students will be better prepared to compare the atmosphere of the European Apothecary Shop with that of the 1890 U.S. Drug Store in concluding the commercial influence of technology.

Settings - The settings in which the observations were conducted are, as follows:

(1) R1 = This rectangular room (1048B) was the initial setting for a fifteen minute factual presentation concerned with pharmaceutical history. The children were asked to observe a contest which succeeded in demonstrating the comparative efficiency of approximately six types of implements used by the pharmacist and his predecessor, the apothecary. The children's attention was easily directed when the docent encouraged visual and verbal participation in comparing the efficiency of these artifacts.

(2) R2 = This rectangular room (1048B) became a setting for fifteen minutes of group experimentation using six types of antique pharmaceutical tools. In this laboratory, the "young apprentices" tried some pill manufacturing processes and created products from the mortar and pestles, herb grinder, pill tiles, pill molds, hand crank pill tablet machine and pill silverer. This multiple activity was helpful in distinguishing between three technological concepts introduced in R1 and emphasizing the knowledge objectives described above.

(3) AS = The Apothecary Shop and Study. Leaving the enclosure of the rectangular room, the group entered the Apothecary Shop, an European period room of the 16th-18th centuries containing approximately 1100 artifacts. The Apothecary Shop surrounded the group and provided a semi-protective viewing environment with two exits/entrances leading into exhibits in the Pharmacy Hall. Seated before a full view of approximately 400 objects in the Apothecary Study, the docent led a discussion emphasizing the artifacts vis-a-vis the technology of the apothecary's world for approximately fifteen minutes. The docent sought to elicit statements from the group about the character of the environment as a scientific laboratory. Later, the group needed these ideas for comparison with the advances in technology and health care which had occurred by 1890.

(4) DS = The 1890 U.S. Drug Store is a period room with over 2,000 artifacts. Visitor entry into the room was not permitted. The group stood outside the room and was subject to extraneous influences within the Hall of Pharmaceutical History. This made the DS a significantly different type of viewing environment for the group. During this final 15 minutes of the tour, the docent directed a summation relevant to the tour objectives.

The group moved from a relatively sterile and simple setting where the focus was on approximately fifteen artifacts to two period rooms where they were exposed to richer environments containing a much larger number of artifacts (roughly 400 and 2,000 artifacts in the AS and DS, respectively).

RESULTS

Table A

Each observation of criterion behavior recorded on the descriptive logs (DL) during eight Pharmacy Tours was assigned to an interpretive category on the basis of both the behavior itself and the situation in which it occurred. The percentage of observations classified within each category for each of the four museum settings is presented in Table A. The data from eight tours (DL) is presented graphically in charts 1 and 2 in appendix A6. The responses collected in descriptive logs were for the most part tour related behaviors.

An example of how Table A may be read is as follows: "In Room R1, of all criterion behaviors, 26% were orientation, 11% were verification, 21% were discovery, and 42% were integration."

Table A

Percentage of Criterion Behaviors Classified within Each Interpretive Category for Each of the Four Museum Settings

	Settings			
	R1	R2	AS	DS
Interpretive Categories: O, V, D and I				
Orientation	26	12	4	1
Verification	11	29	17	27
Discovery	21	12	71	24
Integration	42	47	8	48

Table B

Observations of attention behavior recorded on the structured logs (SL) were assigned to two main categories: tour specific attention (TSA) to the docent or artifact; and non tour specific attention (NTSA). The NTSA observations were further assigned to four sub categories: attending to non tour specific artifacts, attending to other visitors or peers, engaging in non productive behavior, and attending to other museum environments. The percentage of observations within each category for each museum setting is presented in Table B and is graphically presented in chart 5. The data presented in Table B was collected on SL during four later Pharmacy Tours and is separate and distinct from the data collected on DL during eight Pharmacy Tours, seen in Table A. The behaviors recorded on SL did not specify sufficient information to permit classification as O, V, D, or I. However, the advantage of the SL is that it permitted the observer to efficiently gather a large number of responses. Chart 5 in appendix A6 describes 853 responses which were collected from only 2 of 12 existing categories of the four SL. These 853 responses were categorized as TSA or NTSA. The sub categories are described above. The 853 responses from 4 SL was collected over a shorter period of time than the 576 responses from 8 DL. Tour specific attention data is presented alone in chart 4 in appendix A6. [10]

An example of how Table B may be read is as follows: "In Room R1, of all TSA and NTSA responses: 46% were attention to docent; 42% were attention to objects; 4% were NTSA/distracted by artifacts; 3% were NTSA/distracted by visitors or peers; 4% were NTSA/engaged in non productive behaviors; and 1% were NTSA/distracted by other aspects of the museum environment.

[10] A comparison of the distribution of criterion behaviors (data from eight descriptive logs) with the distribution of NTSA responses (data from four structured logs) across four museum settings is presented in chart 3 in appendix A6.

Table B

Percentage of TSA and NTSA for Each of the Four Museum Settings

	Settings			
	R1	R2	AS	DS
TSA Docent	46	17	36	4
Artifacts	42	73	28	27
NTSA Artifacts	4	2	3	4
Visitors/Peers	3	2	11	7
Non Productive Behavior	4	6	18	21
Museum Environments	1	0	5	38

DISCUSSION

An Explanation of the Tour Experience Using the Criterion Behavior Categories

This portion of the report illustrates how data from the descriptive logs was interpreted to expand our understanding of tour events and the interpretive categories for the criterion behaviors. Examples of orientation, verification, discovery, and integration response are given along with some detail of the tour context. This should help the reader understand the manner in which a response was ascribed to one of the categories.

Orientation - One aspect of orientation is visitor conceptualization of a particular problem about the subject being studied. The following incident shows that the docent successfully imparted the apothecary's need for accuracy in measuring ingredients for pills. The child questions the technological capability of a tool and shows orientation to the concept of measurement.

If the docent did nothing but hold up a pill tile after discussing the concept of standardization, some children identified the rule painted on the tile as a guide for cutting pills of equal dosage. The feedback at this point was an indication of group comprehension of standardization. The crudeness of this method of measurement became clear when they watched the demonstration of a more sophisticated implement, the pill roller. The roller forced ingredients between two halves of a mold to produce pills of more uniform dosage in much less time. The group discussed the advantage of this tool and continued to converge on the problem of standardization, as witnessed by the observer:

Oriented to the importance of precision and standardization in the production of medicine, a student asked, "How can you be sure (using this roller) that each pill is exactly equivalent in size?" The specific orientation was to the problem of measurement and a need for precision instruments. The question may also have suggested his dissatisfaction with the imprecision of a tool which forced ingredients to slide between two halves of a mold. A viewpoint was established and the group began to anticipate the characteristics of a more advanced tool. One benefit of orientation for the group was that a person who asked a good question also directed the group to look for solutions.

An example of orientation to the concept of efficiency occurred when the docent demonstrated the use of the pill making machine.

The docent questioned the children on the effect of this invention on the apothecary's life. With inadequate orientation, the group might have responded with such answers as:

(1) The 18th century apothecary could have gained recognition as an intelligent man who used machinery.

(2) The 18th century apothecary might have experienced an increase in business after publicizing his newly acquired machine.

But the fact that adequate orientation occurred was reflected in such responses as, "He had more time to do other things. He could study the effect of his medicinal preparations on the health of patients." This type of response indicated the group's readiness to perceive ways in which technology changed the role of an apothecary by giving him more time to develop his science.

In the Apothecary Shop, the docent asked the children to look for evidence (artifacts) that suggested a scientist at work. One child did not answer verbally but graphically demonstrated his view of the man at work in this period room. He bent his body by hunching his back and moving his hands as if he was stirring a witches' brew. His assessment of the setting was that the period room suggested belief in the existence of magic rather than science. This may be further confirmed when the children discuss the existence of non-scientific artifacts in the setting, such as religious objects. The child perceived the scientific sophistication of the 18th century apothecary by looking at the whole setting.

Twenty-six percent of the total criterion behaviors in the first section of the visit were orientation. The predominance of orientation occurred in this section with a progressive decline in R2 - 12%, AS - 4%, and DS - 1%. At the inception of the structured tour, groups were given a uniform outlook on the problems of early pharmacy and the technological advances which changed the trade and health care. In examining aspects of the subject area as a group, the individual's thought processes, discoveries, and comments contributed to the coherent experience of the group.

There is a need to consider techniques which orient the visitor so that he understands which questions are best answered in the museum and which are to be investigated outside. In this tour, aspects of health care could be further clarified for the visitor by giving him a perspective of other informative exhibits. How might a museum orientation room be used to acquaint visitors in advance of existing principles and tangibles in museum galleries? The docent activity of exploring artifacts and problems related to the subject within a conceptual framework may be a potent way to cultivate orientation.

Verification - One aspect of verification is visitor exploration and validation of properties of an artifact. A docent told the group about the apothecary's use of distasteful ingredients in pill preparations. There are many ways children naturally employ sense impressions to validate the properties of artifacts. The observer noticed children in R1 spontaneously smell and reach into jars of organic drug ingredients, even though the instructor told them to look. In this instance, the docent might have unconsciously signalled the children to employ their sense impressions to validate the properties of artifacts. The observer who is attuned to the significance of subtle, physical gestures and behaviors on the part of the docent and group may be able to detect the emergence of visitor interaction with the docent, artifact and museum. Recognition of these behaviors is especially important when the children are cast in a passive role. This information may be useful to docents. It suggests the occurrence of interest which should be kindled. Opportunities for verification early in the tour may enable children to integrate later in the tour or classroom when a related subject arises.

At the end of R1, the group was aware of the impending opportunity to handle the pharmaceutical implements. At this time, another physical attempt to explore and validate characteristics of artifacts was observed. The children checked their impulse to move toward the objects on the centrally located table. They seemed uncomfortable, yet restrained themselves while another impulse compelled them to seek first-hand contact with the objects. Clearly, the group was prepared for closer inquiry and the children were eager to examine the properties of the artifacts in more detail. These behaviors were compatible with our definition of verification which is an interest in the existence of the object and a desire to explore various attributes of the object.

Verification of the existence of an artifact in history also occurred. The placement of an artifact in time came with the examination of an artifact. The children identified "proof" of the age of an object when they exclaimed, "Are these original? Wow, they're original! Look at that, 1873."

Discovery - Discovery occurred when a visitor comes upon new information in the museum. Discovery might occur within a "silent and motionless" visitor. As the docent demonstrated a pharmaceutical implement, students became totally absorbed by it. With some groups, slow-motion action set in. Hand rested on hips, mouths were half-opened, unblinking eyes fixed on the artifacts and still heads were signs of a transfixed group. The focus of their intense attention was the museum object. The children might know about the existence of an artifact (therefore, not discovery), but specific unknown operational features of an implement were demonstrated and, in many instances, led to discovery.

These body signs were striking physical indicators of steadfast attention to artifacts when compared to the diffuse browsing done by school groups without docents. Browsing or scanning suggested lack of focus or attention and could limit discovery. Photographs taken during two guided tours captured some of these silent expressions and served to document the intense concentration of groups who saw or understood something about an artifact for the first time. These body signs could be used to train docents in cultivating longer spans of silent attention in children.

Recognition of physical signals from a captivated group, which appears to be silent and motionless, is important in the training of responsive docents. We cannot expect museum docents to elicit responses from visitors until they are trained to recognize cues from groups. Using unknown features of artifacts to begin the discovery process may be effectively accomplished by the docent or interpreter. Exhibit designs, museum environments or supplementary guidance type materials can support this activity.

Certain responses to information tell a docent that discovery is occurring. When 4th-6th graders were surprised or shocked by something, they often made "involuntary" sounds which indicated excitation. Students were frequently heard saying, "euuw." They responded in this manner when they learned that drug ingredients were mixed with alcohol or wine to bind them together. In another case, the docent began a discovery process by saying that mustard was used on a patient's feet to cure a health problem. The observation was that some unknown facts elicit a "wow" response. The 4th-6th grade children who already know these facts may tend to respond in a lower key. This can differ with age, social background and training.

Integration - Integration refers to the manner in which a visitor coherently pulls together information that he has known (or has newly discovered) with something he sees in the museum. Forty-two percent of the total criterion behaviors in the R1 section of the museum experience were attributable to integration. This behavior was more conspicuous and seemed to occur with greater frequency during the demonstration activity as compared to the lecture phase of this section. During the demonstration, opportunities to foster integration existed. As witnesses to the comparative operational capabilities of pharmaceutical tools, the group needed to use knowledge from their personal store of information to consider the work of an early pharmacist in light of two technological problems:

(a) the efficiency of the pharmacist's implements. The invention of faster precision machinery decreased the time required for manual tasks and increased the amount of time the pharmacist could devote to research. Integration responses occurred during discussions of this topic. The child who is familiar with the concept of efficiency may have a more comprehensive understanding of it when he can compare the efficiency of two tools.

(b) the need for standardized medical recipes. Recognition of this basic, scientific approach led to the modernization of the pharmaceutical trade and public health care. Integration responses occur when the child attributes the changes in health care to standardization. He may use the words "measure," "weigh the same," "pills are identical," "equal quantity," etc.

An example of integration behavior follows:

The docent used a simple, open-ended question with the group to encourage careful scrutiny of pharmaceutical implements. This was one way to lead the children in seeking clues to the operation of tools. She asked, "What do you notice about this herb grinder?" Several in the group forgot the austerity of the museum and exuberantly answered more than the simple question posed, "It's for a belt, for an engine. It saves (the pharmacist) time and the product is cheaper in the long run."

A trained docent can guide children in using artifacts to process information. In this incident, they examined the visual details of an artifact, recollected stored information (selected information concerned with the advantages of engines), related the groove to technological sophistication and efficiency, and made a conclusion about change in the pharmaceutical trade. The payoff for this type of questioning is tremendous, and may be important in motivating individuals with a background of uninspiring trips to the museum.

It is possible to assume in another example of integration that the child had some vicarious experience as an 18th century visitor to the Apothecary Shop. Early in the AS section, the docent told the group that a black curtain divided the apothecary's study from the main part of the shop. Later, the child learned that the dead animals, hanging from the ceiling, served as an advertisement to clients that this apothecary used "pure" ingredients (from the animals) to make pills. In the following incident, the occurrence of integration involved the child pulling together facts told by the docent with the setting as he visualized it. In this example, the child put these two facts together and recognized a discrepancy. Being in the period room may have stimulated him to test the compatibility of these two statements by asking, "But, if there was a black curtain concealing this study from the shop, how could people see the animals?" Obviously, the child thought that one of the two facts was incorrect or that some information was missing. New information clarified this problem for the child and led to a coherent experience in the Apothecary Shop.

Interpretation of Results

The results in Tables A & B related to the museum environment.

This section illustrates how the behavioral data in Tables A and B increased understanding about groups in physical settings of a museum. In part, the pharmacy experience consisted of recognizing and interpreting architectural differences. The children saw artifacts set in a 16th-18th century period room, a 19th century period room and a 20th century lecture room. The group moved from a contemporary room containing approximately fourteen artifacts to the 16th-18th century Apothecary Shop filled with approximately 1100 artifacts. Table A shows that the percentage of discovery increased from R1 - 12% to AS - 71%. The group spent approximately fifteen minutes in R1 and in the Apothecary Shop. This data was taken from descriptive logs.

The high incidence of discovery in AS may be attributed to two factors. One is that the setting, a period room environment enriched with 1100 artifacts, stimulated this discovery. However, Cohen and Parsons found that casual visitors without docents spent an average of thirty seconds in the Apothecary Shop.[11] Little discovery could have occurred during such a short duration of time. The second factor which contributed to increased discovery in the AS was that a docent supported and provided opportunities for discovery. More discovery occurred in the Apothecary Shop among docent led groups than among casual visitors without docents. This finding suggests the beneficial effect of docent direction on visitors.

The advantages of using a human being to foster discovery are: (1) the sensitivity and flexibility that museum trained personnel may apply in choosing exhibits and demonstrating artifacts, (2) the holding power a docent can exert by offering ideas appropriate to the special interests and skills of a particular group, (3) the trained docent can spontaneously select and use the types of questions or materials which will best lead a group from discovery to another desired behavior or activity, and (4) the docent can direct attention when children tend to digress. The docent can decide to encourage or postpone attention. In contrast, the machine can be effective only if it is permitted by the visitor to continue playing. Building flexibility into an audio program is an expensive proposition.

In addition to presenting new factual material, the docent can demonstrate the proper use of machinery and create a favorable climate for further discovery if trained to assess group interest. Unaided visitors often leave the museum uninformed and misinformed. The docent can differentiate discovery for the visitor by asking about visitor interests. For example, some visitors may benefit

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[11]Casual visitors were timed in the Apothecary Shop for two preliminary studies conducted in 1973. Marilyn S. Cohen, "Verifying Murray's Visitor Behavior Theories and Testing Museum Crowding Stimuli," report for the Museum Behavior Seminar, Office of Museum Programs, Smithsonian Institution, Washington, D. C., 1973, p. 11, and Margaret B. Parsons and Ross J. Loomis, "Visitor Traffic Patterns: Then and Now," report for the Office of Museum Programs, Smithsonian Institution, Washington, D. C., 1973, Figure 8 following p. 11.

by seeing a particular machine for the first time; others may have an opportunity to operate a machine (or facsimile) in order to investigate the principles involved; some would be fascinated to learn of the materials used to design this machine; while another would be interested in the special skills needed to operate it; and others may seek information to understand the significance of a machine in a country's historic development.

The diverse museum audience along with its diverse learning approaches leads us to the value of maximizing the ability of the docent as an arm of the exhibit. A recommendation coming out of this discussion is that docents of this particular tour should be trained to increase discovery in the Drug Store. Their ability to support discovery is evident in the Apothecary Shop. Chart 4 shows that total attention responses dropped from the rectangular room (R2 - 90%) to the museum hall (AS - 64%). However, an even sharper decline in attention occurred when the group moved from the AS (64%) to the DS (31%). Although the DS represented a more distracting environment and occurred at the end of the tour, the docent could probably increase attention in the DS by emphasizing and directing more discovery here.

The researcher's interest in the increase of discovery and decrease of integration in the move from R2 to AS leads to a consideration of architectural space and scale as it affects the visitor's behavior. How do architectural/spatial contrasts place demands upon a visitor's visual perceptual skills and influence the way in which he responds to and organizes concepts and artifacts? Imagine the visual flexibility and preparation one needs to decode information during a tour of a sixty foot grand foyer, a two-and-a-half foot diorama, a fifteen foot period room, a seven foot tunnel, a seventeen foot nuclear reactor, and a fleet of battleship models, one foot in height. Systematic visual perception training may be used to attune children to the existing environments.[12] In the museum, visitors should attend to and use

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[12]Marion Grossman, "Art Education for the Young Child," Review of Educational Research 40 (June, 1970): 422. In his article, Grossman quoting Salome (1966, p. 28) says, "... without special instruction, young children fail to develop fully their visual perceptual skills and that such deficiencies influence the way children respond to and organize stimuli. Salome's studies along with those by Dubin (1946), Douglas and Schwartz (1967), and others seem to strongly indicate that young children's artistic and perceptual abilities can be influenced by instruction."

visual information and cues, (i.e. shape, scale proportion, line, color, variation of texture, and patterns) in establishing a basis to interpret the objects, exhibits, and spaces around him.

In the transition from the rectangular room (R1) to the museum (AS), integration dropped to 8%. Integration is a process which required time and continued attention to one or more ideas. It has just been stated that discovery was stimulated by the setting and the docent in the AS. Perhaps, discovery was a natural response in the AS because the groups came from the "laboratory" situation in R2 where free discovery was encouraged. In other words, the group was primed for discovery when they left R2. However, if the docent is concerned with the decreased attention in AS (R2 - 90% attention to AS - 64% attention), she may want to follow up some of the many discovery responses (AS - 70% D) with integration in the AS. It should be possible for docents to structure more integration into AS. The decline in integration is probably not due to fatigue since we see that integration still represented a majority of the responses at the end of the tour. Integration consistently predominated over the other criterion behavior categories in three seetings, R1 - 42%, R2 - 47%, and DS - 48%. This data was taken from Table A and was based upon the descriptive logs.

The docent planned summation activities for the end of the tour. A good percentage of integration was obtained in the DS. Early in the tour, docents structured and provided opportunities for the creation of hypotheses by the children and elicited a great deal of integration. Pursuit of hypotheses and good guesses could be helfpul in increasing integration in the AS also.

Docents concerned with encouraging integration must learn to be information gatherers and organizers. Docents trained to disseminate information can also be trained to gather responses from visitors. Docent records of visitor response can support decisions about the use of artifacts for school age children in stimulating integration. For example, exhibits can be an exciting place to discuss inventions which increased efficiency (in the pharmaceutical trade or any other profession). Lengthy expositions do not serve children's needs. However, docents who ascertain visitor interest in specific artifacts can use this interest to nourish the flow of ideas while directing a comparison of tools and operational features which permit or preclude efficiency. Integration of ideas with messages communicated by artifacts and exhibits can occur with greater frequency if docents are trained to help visitors pull ideas and visual clues together.

It is hypothesized that a setting which gives importance to pulling together old and new information and to period room exhibit design, as well as to testing and sharing creative combinations of ideas, will instill in visitors the value of such behavior. Unusual and even incorrect statements may be accepted by the docent as an indication of this productive behavior.[13] In addition, the group is given the technological framework which enable them to integrate appropriate and useful information leading to a coherent museum experience. A museum visit, designed to provide opportunities for integrative behavior, may award the knowledgeable or uninformed with a greater depth of experience by urging the exploration of artifacts in relationship to historic or cultural concepts.

Group movement research applied to the tour.

Group movement may be a natural information seeking behavior. Johansson (1970), in summarizing a fellow researcher, Gibson (1966), says, "It is not possible for the eye to get specific and veridical information about space from a single static convergence point...A set of convergence points in space can, taken as a unit, bring about specific and veridical information about this space...Locomotion (motion) of the eye through a series of convergence points represents a successive combination of information in the same way and therefore gives specific 3-D information about a rigid environment."[14]

It may be desirable to eliminate some of the confusion of the simultaneous communications from the docent and atmosphere which occurred when the group first entered the Apothecary Shop. The group, astonished by the exhibition, naturally began to discuss and investigate the period room from many perspectives. Such group movement may be an indication of productive discovery behavior occurring. Before this time, it would behoove the docent to use handout materials which permit individualized, yet structured visual investigation. This procedure could serve four purposes: (1) permitting the docent time to assess the museum readiness of the group, and through observation of their behavior and responses learn what is new in this area for each particular group; (2) giving the group an opportunity to practice the skills and

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[13]Adolphe E. Meyer, An Educational History of the American People (New York: McGraw Hill, 1957), p. 254. Meyer quotes John Dewey from his 1916 book, Democracy and Education, "...education is the constant organization and reorganization of previous experience." Upon hearing unusual comments from a child, the docent who realizes this as part of the learning process can help a child reorganize information and come closer to making a correct statement.

[14]Gunnar Johansson, "On Theories for Visual Space Perception," The Scandinavian Journal of Psychology 11 (1970): 71.

the independence for which they were prepared in R2; (3) permitting the free discovery of information which can occur in a museum by exercising locomotion of the eye; (4) individualizing the pace and activity of this section in hopes of maximizing group concentration during the final and exacting section of the experience. With this feedback, the docent can become an excellent source of the potential of different exhibits.

Group position and a period room.

When they approached the DS, the groups found themselves in a different architectural space. Essentially, they were in a 20th century space looking into a 19th century period room. Photographs taken during the study depicted a group positioned in the small doorway area of the Drug Store. This area permitted limited viewing conditions for groups of 10 or more. An alternative arrangement involved grouping the children in separate clusters on the floor, exhibit ledge and nearby bench which terminated close-range investigation, adversely affected concentration, permitted the non-tour specific environment to distract the group, and threatened the docent-group rapport. Unlike the Apothecary Shop, the Drug Store required visitors to remain outside the period room.

This was a time when more mental effort was necessary. Conclusions needed to be drawn while integrating a totally new set of artifacts and diversified exhibition area with facts and concepts discussed previously in the rectangular room and the Apothecary's Study. Unlike behavior observed in the enveloping environment of the Apothecary Shop, the group in the Drug Store scattered into open spaces leading to other exhibition areas. The docent maintained a focus on evidence and selection of artifacts which assisted in understanding the basic technological concepts of the tour.

As the group adjusted to this Drug Store space, several factors seemed to affect their experience, including:

(a) Exhibit Design. This exhibit design unintentionally created some barriers for groups who needed to be assembled in one place. The groups observed had difficulty finding a comfortable place to cluster.

(b) Environment. The distraction level was high due to lighting, sound, height, and content of adjacent galleries. The easily visible movement of other visitors, lack of sound buffering, and the ambiguity of the exhibit boundaries are some of the elements of DS which are not as prevalent in the Apothecary or rectangular

room 1048B spaces. In the Apothecary, children who walked away from the Study remained in the environment of the Apothecary Shop. At the entryway to the Drug Store, those who walked even a short distance were potentially drawn to other exhibits and non-tour related environments.

(c) Condition of Group and Tour Demands. During this final section of the structured museum experience, there was an increase in fatigue and content satiation experienced by the docent and group.

An additional surge of effort must be expended at this time if the docent and the children are to be focused on a comparison of the Drug Store and the Apothecary. Objects in the DS needed to be understood in relationship to the concepts expressed within the tour framework. A set of conclusions about the effects of technology on the pharmacist's trade and the quality of health care were called for at this time.

Visual perception research applied to the tour.

Of specific interest to museum professionals are studies in visual perception of architectural spaces and rooms. In an article on this subject, Johansson (1970) states that, "...the main function of 'ecological optics' is to develop a model for how reflected light carries visually decodable information about an organism's environment...In terms of distal-proximal stimuli this means that you start with the distal environment and ask what information about it is available proximally at the eye."[15]

Knowledge of visual perception and its relationship to the process of discovering and attending to specific information would be useful to the period room designer, educator and museum gallery planner. It would be useful to know if, upon entering the Hall of Pharmaceutical History, or any hall, questions about the distal environment need to be answered first. In the museum, curiosity is stirred by extraneous exhibits which are partially visible and seem to be just around the corner. Informing the group that this wing contains exhibits relevant to early medical and dental history may quell but not discourage interest. The natural tendency of children to be concerned with and move toward subject matter furthest away is sometimes disruptive for the docent who attempts to focus the group upon

[15]Ibid., p. 67.

the nearby objects. It may be productive to discuss the contents of distant exhibits and recommend them for independent viewing. A brochure may satisfy this interest in the distal environment.[16]

How can an orientation room, museum room, or teacher prepare groups for spatial changes encountered in the museum? The natural tendency for visitors to apply a familiar standard in their attempts to visually perceive the variety of spaces in a museum is a dilemma raised here.[17]

Another set of data, the structured logs of Table B, revealed an increase in specific types of non-tour specific attention (NTSA) as the groups moved from the rectangular room to the period rooms. The table below looks at only two kinds of NTSA. The reader should look at the increase in NTSA from R2 to AS, as well as the general increase in NTSA from the rectangular room to the period rooms.

	No Museum Hall		Museum Hall	
	Rectangular Room		Period Rooms	
	R1	R2	AS	DS
NTSA/attention to other environments	1%	.00%	5%	38%
NTSA/non-productive behaviors	4%	6%	18%	21%
Total NTSA (this included four types of NTSA	12%	10%	36%	70%

[16]Margaret Parsons, Museum Studies Specialist, Psychological and Sociological Studies Program, Office of Museum Programs, Smithsonian Institution, Washington, D. C., developed an orientation brochure which could satisfy this interest in the distal environment. Although it was not originally designed for this purpose or for school group situations, it was discussed with Smithsonian docents who recommended its use with school groups.

[17]Tommy Garling, "Studies in Visual Perception of Architectural Spaces and Rooms," The Scandinavian Journal of Psychology 11 (1970): 127. Garling's article raises this topic of predetermined responses. "It may then be argued that the first stimulus presented will at least temporarily serve as a standard..." Experiments in architectural space perception may assist us in understanding visitor response to architectural contrasts in a museum. Tommy Garling, the Psychological Laboratories, University of Stockholm, Sweden; John Senders, Brandeis University, and Gunnar Johansson, Department of Psychology, University of Uppsala, Sweden, are engaged in research which informs museum professionals who deal with visual space and object perception on the part of visitors.

Docents should be aware that distractions occurred and are perhaps inevitable. It seems reasonable that the group responded to the various types of non tour related settings and displays in the museum. The displays and the environment of the museum often compete for children's attention. Experienced docents seem to be more relaxed about NTSA of the children. They learn how to permit curiosity about the museum. Docents who expect total attention may respond to NTSA in a non-productive manner, such as commanding everyone's attention.

It is interesting to look at the tour group and its social adaptation to varied environments. Kelly discusses a constant and fluid environment and the behavioral responses to these environments in two schools.[18] James Kelly, a research psychologist; offers two contrasting social environments which helped in looking at the findings. If children in the rectangular room considered it a classroom setting with a constant environment, we would expect to observe the following types of behavior predicted by Kelly.

> In a constant environment, where there are fewer settings for the expression of personal opinions, overt behavior becomes stereotyped and ritualistic...the constant environment will generate roles that emphasize solid citizenship and confirmity...At the constant school, there was one style of low level commentary...

An indication of low level commentary in R1 and R2 is NTSA/distracted by peers. Little verbal and non verbal exchange occurred among students in R1 - 3% and R2 - 2%.

If the museum period rooms were viewed as a fluid environment, we would expect an increase in noise level and intense aggressive gesturing and talking when the children moved into these museum settings. Indeed, quiet listeners with subdued behavior in the rectangular room became loud children with divergent interests and opinions in the museum hall and rooms.

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[18]James G. Kelly, "Naturalistic Observations in Contrasting Social Environments," in Naturalistic Viewpoints in Psychological Research, eds: Edwin P. Willems and Harold L. Raush (New York: Holt, Rinehart and Winston, Inc., 1969), p. 189.

The low level of commentary among peers in R1 (3%) and R2 (2%) increased in the more fluid environment of the period rooms, AS (11%) and DS (7%). Non-tour specific attention, non-productive behaviors may be a clue to stereotypic behavior during the tour. Perhaps, NTSA/non-productive behaviors in a constant environment would be fewer than in a fluid environment, which encourages more expressive behaviors. Table B shows that NTSA/non-productive behaviors were as follows: R1 = 4%, R2 = 6%, AS = 18% and DS = 21%. Kelly describes a fluid environment as one which,

> "...will generate roles that emphasize innovation and variation among individuals....can accommodate persons with a high preference for exploration...encourages more public, expressive behavior." [19]

Docents could be trained to handle the transition from a constant to a fluid environment. In part, this is a disciplinary matter. However, variation among individuals and the preference for exploration can also be tied to meaningful mental exercises. It might be said that R2 was more a fluid environment than R1. The structured activities, carefully explained by the docents in R1, permitted exploration and variation among individuals which was productive in R2. Although the docent did not dominate the discussion during R2, her influence was felt and she could easily have left the group for fifteen minutes with confidence that they would explore in the manner she had decided would be useful.

The need to understand the docent's role in creating a psychological setting for children seems more critical in the period rooms than in R1 and R2. This should be explored further with the goal of increasing the docent's ability to structure exploration without being extremely directive at all times. Training docents to create a psychological setting may be aided by video tape. Fuller and Manning says,

> "Several studies...demonstrate that video playback can increase, from pre- to post-, the frequency of easily specifiable, recognizable behaviors..." Another possible outcome is, "...an increase in sensitivity to one's gestures and mannerisms (Herring, 1969). There is even some evidence that more time spent in feedback activities increases realism about self, defined as self-insight (Smith & Kight, 1959)." [20]

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[19] Ibid., p. 192-193.

[20] Frances F. Fuller and Brad A. Manning, "Self-Confrontation Reviewed: A Conceptualization for Video Playback in Teacher Education," Review of Educational Research 43 (Fall, 1973): 472 and 477.

Continued study of the relevance of other areas of research to the findings of this report is needed. A few kinds of research were briefly mentioned in this section to suggest exploration of their applicability to the improvement of tour programs and docent training programs.

CONCLUSIONS

The observational study of group behaviors enabled the Office of Museum Programs to describe four interpretive categories for museum criterion behaviors, O, V, D, and I, to the extent that further testing would establish their utility. The results and their interpretation provided sufficient data and ideas to warrant further exploration of the applicability of these categories to the museum quest for quality. The three studies suggested in this section are directed at improving the quality of museum tours. The study shows that the criterion behavior categories can be used to enhance our understanding of the substantive nature of tours in different museum settings. This study has shown that the complexity of the museum experience can be addressed by a team of museum professionals and research psychologists.

The categories can be applied to the design of docent techniques. Future efforts to examine this type of practical problem would be feasible with a team of one museum professional, one research director, one technician and docent assistants. The study of integration would provide additional dividends in that it is also a study of how children form concepts in the museum setting.

This preliminary study was an attempt to develop criterion behaviors as a research tool. Next, they should be tested with docents and children before being employed as a final standard to judge the quality of tour programs on docent techniques.

Suggestions for Future Study

The thinking that evolved during this study led to specific suggestions concerning the ways a museum can meet its responsibility to assist children. For example, by training docents to recognize behaviors associated with various criterion behavior categories, the docent may be able to respond in the course of the presentation to the receptivity of the group. In this way, the docent can better promote the overall tour and museum objectives which include: (1) interpretation of exhibit content, (2) management of time and (3) conceptualization of museum usefulness.

The design of docent techniques could be based upon the findings of the 1973 observational study and accessible information about children's skills, needs and receptivity to the museum. At the same time, there exists the intriguing possibility that exploration of docent techniques to foster integration would permit study into the ways that elementary school children form concepts in the museum settings.

The following section suggests three studies for a research group. One is a study of integration. It is proposed to determine a way to assist docents in improving children's ability to interpret exhibit content. The second study is concerned with sequencing orientation, verification, discovery and integration as a means of improving children's ability to manage their time and activities during a visit. The third study is concerned with docent handling of group situations which arise at different stages of the tour.

The development of interface techniques: A study of integration

The 1973 study raised several possibilities for examining docent procedures and designing interface techniques based upon the criterion behavior category, integration. Webster defines interface as, "the place at which or means by which two independent systems meet, act upon and communicate with each other.[21] Therefore, interface techniques would be used by the docent to sustain a favorable climate for behaviors associated with integration. Children exposed to these techniques would demonstrate greater readiness and ability to discuss concepts and a priori notions while examining artifacts. The docent should be able to elicit behaviors which encourage integration through use of interface techniques. These techniques may involve:

(1) sequencing the environment. How does the environment in which the group is exposed to the artifact affect group integrative behavior? Will more integration occur if a concept or theme is discussed with visual reference to a few artifacts, first in a simple setting and later in an elaborate setting?

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[21] Webster's Seventh New Collegiate Dictionary, rev. ed. (1972), s.v. "interface."

The classroom, orientation center, or simple display case may constitute a simplified setting, whereas the period room, gallery, exhibition, film, or demonstration area in the museum may provide a more visually complex viewing environment. Children may benefit by a preparatory experience where attention is given to existing sequences of simple and complex environments. With this preparation a child may be better able to focus on the conceptual content of different settings.

(2) handling the artifact. Does a demonstration of the operational features of an artifact result in improved or sustained integration? Is there a difference in integration if visitors have an opportunity to manipulate the artifact or a facsimile of the artifact? Is there a difference if only a discussion of the operational features of an artifact or period room is used? Can questions help children anticipate the outcome of demonstrations? How do the questions serve as a substitute for the actual handling of artifacts?

(3) discussing artifacts in an historic and/or technological framework. Does a conceptual orientation to the social needs or historic circumstances which produced an artifact, period room or idea motivate integration? Can unlinked factual descriptions of artifacts without an historic and/or technological framework be a barrier to integration? What types of concepts or abstractions are appropriately used with fourth through sixth graders?

(4) using stored knowledge. What techniques can be developed to assist groups in delving into their storehouse of experiences and beliefs to distinguish information which is appropriate for new discoveries made in the museum? What are some effective ways to discover and discuss the group's understanding of technology, for example, as it contributed to efficiency at different times in history? A museum visitor has the advantage of looking at authentic artifacts from different periods of time in history.

To design a study of integration, some aspects of experimental design were discussed with Dr. Ross Loomis and Dr. Karl Weick. A strategy for analyzing the data has not yet been formulated and this represents a problem which requires the assistance of experienced researchers. The experimental design would include:

Pretest and Post test - In discussing an experimental design to test the effect of interface techniques on integration (a tentative assumption is that integration embodies conceptual learning), David Estabrook of the National Museum of History and Technology, Dr. Ross Loomis of Colorado State University and Dr. Karl Weick of Cornell University were concerned

with developing an accurate pretest and post test situation which involved the child in a museum-related task.

Before and after exposure to specific interface techniques in the National Museum of History and Technology, groups would be asked to construct an "exhibit" with the option of using museum artifacts, words, display case units and non-tour related artifacts. Museum groups of thirty or more children, accompanied by one docent in the Colonial Life Halls would be the subjects for these tests. In the pretest and post test situations, five or six children might work together to build an exhibit using the materials described above. Instructions and pre-packaged kits with materials would be given to the children.

Objective data collection is of great importance in studying group response. The camera can be used to record simultaneously occurring and subtle group behaviors. The use of one observer-recorder increases the risk of losing data on behavior occurring among others in the group. Data on film is available as documentation for further assessment and can be used to check the recorder's reliability at different times in the study.

The display case unit might be designed for use in the museum and school. See appendix B1 for initial plans detailing these units. As the children arrange their exhibit design in these cases, the observer may try to determine if the exhibit is conceptualized as existing in one of the following possible settings:

(a) a period room setting,
(b) a table arrangement (this was used in the museum room presentation of artifacts),
(c) a vertical display case with frontal view,
(d) a tub arrangement with viewers looking into the case,
(e) a free standing pedestal type case with a view of the exhibit from all sides.

The underlying hypothesis here is that groups who have been exposed to interface techniques in the rectangular room and period rooms will make a distinction about their own exhibit designs. During interviews, these children may talk about the setting as well as the artifacts. Groups without exposure to interface techniques will not make a distinction between any of the settings listed above.

Experimental Groups - The experimental groups should be systematically tested for each interface technique and each tour setting. Selection of intact classes and measurement of covariates, i.e., characteristics of children which include reading level, previous knowledge of subject matter, grade, etc., will be controlled.

These groups would be exposed to different settings as follows:

(a) museum room presentation of artifacts only,
(b) artifacts in gallery and period rooms only,
(c) both of the above,
(d) neither of the above (control group),
(e) non-museum experience.

Techniques and settings considered in a pretest and post test would occur as follows:

Testing Schedule

Experimental Groups					
	Rectangular Room Artifacts Demonstrated and Handled	Period Rooms Artifacts Viewed	Both	Neither Control Group	Non-Museum Experience Only*
Present Tour Technique					
Implementation of New Interface Technique					

*This category is concerned with the effect of substituting a department store setting, for example, on integration or conceptual learning.

Upon completion of the pretest and post test package, data would be collected on the tour groups participating in Pharmacy or Colonial Life Tours.

Dependent Variables - In order to assess the net change in incidence of integration, the researchers should record the performance of groups during the post test. Standards for performance need to be crystalized and discussed with curators, psychologists and educators. Performance measures should include the cognitive, affective and psychomotor domains in assessing how groups:

(a) put objects of the same category together. Principles of organization are involved.

(b) incorporate novel artifacts, i.e., artifacts not seen in the museum nor familiar to groups. If a technique is successful in increasing integration, the groups should be able to use unfamiliar artifacts in a way which shows they have been influenced by tour techniques. An analysis of the relationship between artifacts and ideas is involved.

(c) ask for assistance. Seeking behavior may result in comprehension of ideas or artifacts.

(d) develop and/or process a concept. Do they have an understanding of the subtle aspects of a concept, and do they choose to incorporate correct information into their exhibit? Here the accuracy of conceptual thinking would be assessed.

(e) master the task. Do they use a multi-dimensional rather than a single focus in organizing the exhibit? If more integration occurs during a museum visit, do groups respond to post tests with more imagination? Do they incorporate new ideas, labels, etc. into their exhibit? Do they try a greater number of combinations of ideas, labels, artifacts, etc. before completing the task? Ability to form mental images and to interpret is examined.

Indicator behaviors which reveal group attitudes can be employed in the pretest and post tests.[22] Some indicator behaviors should be chosen to determine:

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[22]Robert F. Mager, Goal analysis (Belmont, California: Fearon Publishers, Lear Siegler, Inc., 1972), p. 16. "A statement about attitude is a statement of prediction based on what somebody says. The behaviors on which attitude statements are made can properly be called indicator behaviors."

(a) Which groups complete the task and respond with satisfaction? Which groups respond with frustration?

(b) Which groups indicate a preference or dislike for museum artifacts, concepts, and exhibits during the tests? Do groups recognize, exchange or discuss artifacts in assembling their exhibit? Do they pick up all or just one artifact for their exhibit? Do they name, identify, describe or compare the artifacts? Awareness is assessed by these questions.

(c) Which groups express a value for the museum's curatorial, research, education, interpretation and presentation functions? This may be asked for in verbal or written form. Groups should be observed for level of competence, selective concentration, interest in task, and pleasure in activity.[23]

Method - For this study, a systematic collection of data on video tape is recommended. The post test may be objectively recorded on video tape and studied. It is advantageous to use film because it provides easy cross checking and recovery of lost data. The observer has a first-hand opportunity to record integration, but may decipher subtle dimensions of behavior only upon review of several video tapes. Greater reliability occurs when tapes are screened by different professionals.

A video tape record of the pretest would permit a comparison between the pretest and post test results. In this way, the human observer may recall, without distortion, the pretest responses. The time between tests and the sheer number of children involved may result in unintentional distortion.

A study to sequence O, V, D & I

A study may be conducted to determine if discovery (or techniques used to elicit behaviors which support discovery) are "best" alone or "best" embedded first, middle or last in a sequence during the tour.

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[23]Robert J. Kibler, Larry L. Barker and David T. Miles, Behavioral Objectives and Instruction (Boston: Allyn and Bacon, Inc., 1970), pp. 56-66. "The affective domain contains behaviors and objectives which have some emotional overtone. It encompasses likes and dislikes, attitudes, values, and beliefs."

Two assumptions provide the foundation for this study. Th first assumption, a theoretical one, is that an understanding of docent effectiveness can be gained by studying the ecology of learning, which means viewing the docent as she directs and sequences activities, format, and exposure to artifacts within the museum setting. The research questions to be answered are: How can these museum settings be sequenced productively? How do the parts relate to each other? How do they influence the behavior of the children?

The second assumption, a methodological one, is that the observation of intact museum settings and the sequencing of events is the optional investigative path.[24] This is recommended over conducting tight experiments on the nature of sequencing in a laboratory setting.

Dr. Karl Weick suggested using different sequences during the tours. The desired outcome is a difference in the way visitors independently decide to sequence a visit.[25] One assurance that the difference is due to sequencing and not docent style is to control this influence by having four docents conduct four different segments of the tour.

For this study, it would be useful to look at the following:

(a) In a role reversed situation, how does the visitor escort the guide through a unfamiliar exhibit area? Does visitor recapitulate the the sequence he/she was exposed to? Tracking and interviewing may determine his sequencing behavior.

(b) Does the average viewing time increase after exposure to this procedure?

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[24]Paul V. Gump, "Intra-Setting Analysis: The Third Grade Classroom as a Special but Instructive Case," in Naturalistic Viewpoints in Psychological Research, eds: Edwin P. Willems and Harold L. Raush (New York: Holt, Rinehart and Winston, Inc., 1969), p. 200.

[25]James B. Taylor, Science on Display: A Study of the U.S. Science Exhibit Seattle World's Fair (Seattle, Washington: Institute for Sociological Research, University of Washington, [1963]), pp. 163-164. Taylor considers sequence an important aspect of a museum tour. He says, "Going through an exhibit hall is a process....in a display hall the audience moves from scene to scene....Each scene...builds upon and enriches the ones that preceded it....Each display interacts with those viewed before and those viewed after."

(c) What and how much more does a visitor want to see after exposure to the sequenced tour? Interviews can be used to determine how the visitor plans to manage additional time. A tracker should contrast a visitor's plans with what actually happens. Is there evidence of planned movement, rhythm or timing on the part of the visitor?

(d) Ask the visitor to write questions about new things seen in exhibit areas. Do they write factual, comparison or conceptual type questions? A pretest and post test will consider the entering skills of visitors.

(e) Is a process or static orientation expressed by the children by the end of the tour?[26]

(f) After exposure to a structured visit, will the children choose books, records or pamphlets which relate to museum topics or will they choose items which are not topical such as Smithsonian Institution key chains, puzzles, etc?

Another interesting question related to this study is, how do groups sequence themselves after they are told the advantages in an orientation hall? Do people use a self guiding technique suggested by a museum if it is clearly outlined at the beginning of their visit to the museum? Can the museum assist people to develop a means of approaching the contents of a hall by revealing the specific behaviors which will make their visit more conceptually profitable? A study could examine the sequencing of O, V, D, and I by self-directed visitors.

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[26]Ibid., pp. 163-166. Taylor describes "process orientation" as one in which the visitor moves through a series of displays which produce a total impression and a cumulative experience. Each display interacts with those viewed before and those viewed after. The static orientation is one in which the visitor sees a series of unrelated displays. He may as an observer have been static, standing mute before the display. He views a display as if he is viewing a single prized painting. The static orientation is one which takes no account of the time dimension or the total complexity of the viewer's experience.

A study using introspective docents

Dr. Karl Weick suggested a self scrutiny study by docents. The advantage of using introspection is that any museum, regardless of staff size, could engage in such a study. In the case of a Psychological and Sociological Studies Program Study, a researcher could video tape herself as she conducted a structured tour. Immediate review of the results on video tape would help her to recall her reactions to specific behavior and the group at each stage. This type of introspection would provide a wealth of data on the interaction of the visitors with different environments, with the docent, and the exhibits. This data would be useful for the program development.

Having completed such a study, we would have a valuable technique which could be applied to a whole program or a portion of a tour. It would enable the docent, interpreter, or lecturer to monitor (through video tape) gut responses and to analyze the data. One practical question is, what triggered "good" and "bad" action and how did the museum person handle a situation?

Some of the specifics this study would examine include:

(a) Isolating the highs and lows of a tour, lecture, exhibit, etc.
(b) Pin-pointing what is common to the highs and absent from the lows.
(c) Translating these into hypotheses, e.g., the more direct eye contact a docent maintains, the fewer the visitors who wander away.
(d) Testing a naive population.
(e) Dividing the tour into time segments in order to measure the amount of eye contact and counting the number of inattentive or wandering members of the group. Example:

Docent Eye Contact as it Affects Attention*

	Eye Contact Time					
Time elapsed	0-30"	31"-1'	1'-1'30"	1'30"-2"	2'-2'30"	2'30"-3'
0				10		
5		19				
10			14			
15						

*Using a time sample, the number of children in the group who are inattentive would be recorded under the appropriate column. The columns indicate the length of time the docent has maintained eye contact with the group.

In considering the benefits of a study using the introspective docent, it might be profitable to consult with an anthropologist to decide how a docent can be trained to deal with the cultural milieu of an exhibit. What are some skills she can learn to impart a feeling for the culture and the artifacts it produced? How can a docent stimulate interest in the uniqueness of different cultures and their values? The use of orientation is appropriate in this effort to elicit questions from the children which indicate that they are viewing artifacts and settings from a cultural perspective. How can a docent encourage the visitors to spend more time dealing with sights and sounds, facts and concepts within a cultural context? Perhaps, some presentation techniques need to be examined for their effect on this type of cultural focus. Spinning a yarn about the early days of pharmacy, role playing with a group as a means of examining the development of prehistoric man, or using music and folklore to describe a child's life among the mountain people could be effective ways to present the culture and the artifacts found in a culture. The use of video tape could clarify some of the body movements, gestures, voice modulations and eye contacts used by performers. The docent could become aware of herself as a performer and decide upon her own needs. Self-confrontation could result in a docent deciding upon the level of rhetorical forcefulness she could realistically achieve.[27]

Video tape could also assist the docent to create a cultural setting directed at integrative behavior, to develop some rhetorical forcefulness, and to compare aspects of culture as an anthropologist might. Hypothetically, once the museum visitor inquires into the cultural differences between the pilots who flew B-52's and Kamikaze bombers and the societies they represented, the docent would be prepared. Some children gain only a cursory understanding of labels and graphic displays. Docent can learn to generate questions about the interesting cultural and historic problems and viewpoints surrounding an artifact. The museum seems an ideal place for this type of orientation behavior.

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[27]Frances F. Fuller and Brad A. Manning, "Self-Confrontation Reviewed: A Conceptualization for Video Playback in Teacher Education," Review of Educational Research 43 (Fall 1973): 469-471. The use of video tape for (docent) training receives support by the authors of this article who report, "Pre-service teachers are probably most often recipients of these services (video education, training, or therapy). Behavior modification provides the base for micro teaching (McDonald, 1973). Holzman (1969) attempts to conceptualize what actually goes on during self-confrontation." Use of video tape would permit a docent to see herself and others attempting to perform some specified teaching behavior with the opportunity to re-do the teaching.

Another aspect of the introspective docent study could deal specifically with the types of questions asked by docents and their effectiveness. Docents would benefit by learning to distinguish between different types of questions which:

(a) are impossible to answer. The visitor might discover the limits of a museum's teaching capability and what information is provided by other institutions.

(b) permit or expect no response. The rhetorical question may be useful to create expectancy at the beginning of a museum experience.

(c) require feedback. Docents may respond with a stock answer. This response probably has a negligible impact on increasing group interest. Docents may respond flexibly and allow the feedback to direct the course of the discussion. (A more personal interaction occurs and could have some lasting effects during the tour.)

(d) foster curiosity. General and specific curiosity may direct a group to think about technology, history, religion, etc. Questions may be posed about artifacts before the group actually handles them. What if we eliminated the opportunity to satisfy curiosity by preventing exploration? Would the questions work alone or are they best in combination with handling?

(e) relate ideas to artifacts, environments, or themes. This should foster integration. Can a movie or slide show in a gallery, classroom, or orientation center do as good a job asking questions as a human being? What is the effect of questions posed by a druggist on film seen in the 1890's Drug Store?

In each of these studies, we also seek to answer these questions which are related to current concerns in the education of teachers.

(1) What effects on children are observable after docents are trained?

(2) What docent behaviors are related to particular effects?

(3) What are the needs of museum staffs in developing training programs for docents/interpreters?

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SUBMITTED TO ERIC DOCUMENT REPRODUCTION SERVICE.

P. 39

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APPENDICES

APPENDIX A

INSTRUMENTS AND DATA

APPENDIX A1

PHOTOGRAPHS OF THE PHARMACEUTICAL HISTORY TOUR

THE HALL OF PHARMACEUTICAL HISTORY
NMHT

Visiting school groups look at displays of mortars and pestles with the guidance of a museum docent. The photographs which follow depict four segments of the Pharmacy Tour. The 1973 study observed the children's experience during this structured tour. The development of the project and examination of preliminary data was undertaken by Dr. Ross Loomis, Professor of Psychology at Colorado State University and Visiting Research Psychologist, Smithsonian Institution, 1972-73, and Ms. Jean Chen, Learning Research Specialist, Psychological and Sociological Studies Program, Office of Museum Programs, Smithsonian Institution, Washington, D. C.

Periodic discussions occurred with Mr. David Estabrook, Senior Education Coordinator, Office of Elementary and Secondary Education, Smithsonian Institution, who supported our efforts and arranged for repeated observations of the docent structured museum experience in the National Museum of History and Technology. Dr. Karl Weick, Research Psychologist, Cornell University, provided additional consultation and contributed to our thinking of future experiments based upon this study. Editorial assistance was provided by Ms. Avis Berman, Research Librarian, Office of Museum Programs, Smithsonian Institution, Washington, D. C. and Dr. Arthur G. Fraas, Assistant Professor, Department of Economics, U. S. Naval Academy, Annapolis, Maryland. Photographs by Barbara Charles.

R1 - The first 15 minute segment of a one hour Pharmacy Tour

The children participate with the docent in a discussion of early health care in this rectangular museum room. The docent demonstrates the use of apothecary tools from the museum collection.

R2 - The second 15 minute segment of the Pharmacy Tour

Groups of fourth through seventh graders work with an apothecary's tools in a simulated "laboratory" setting. The group remains in this rectangular room before moving out into the museum galleries.

AS - The third 15 minute segment of the Pharmacy Tour

Typically, the children sit in this 16th-18th century Apothecary Shop and face the Apothecary's Study (center of photograph). The docent guides discussion of the apothecary's scientific knowledge while the children examine period room artifacts through the glass shield.

DS - The fourth 15 minute segment of the Pharmacy Tour

The children stand in the doorway of the 1890's Drug Store. The docent guides the group in drawing conclusions about changes in public health care which occur with the advent of technology.

APPENDIX A2

TOUR OBJECTIVES OF THE PHARMACEUTICAL HISTORY TOUR

The objectives of the discovery lesson in the Hall of Pharmaceutical History were described by David Estabrook as:

1. Knowledge Objectives:

   a) To know the general process of producing pills by mortar and pestle before the invention of the hand crank pill machine.

   b) To know the process of producing pills with the hand crank pill machine.

   c) To know that in their final forms, pills were coated with various substances either to add flavor and destroy the medicinal taste or for preservation of the pill.

   d) To know that technology caused many changes in the means of production, the economy, and the lives of the people.

   e) To know that these changes brought both advantages and disadvantages to the individual and his society.

2. Skill Objectives:

   a) Presented with a historical problem and a practical experiment, students will compare products to conclude that costs would be reduced while quality, quantity, and efficiency would be increased by the machine process.

   b) Given the practical experiment, students will conclude that mass production would be the next step in the process of pill making.

   c) Presented with the historical problem, students will speculate that although the advantages of mass-production were great, the personal touch of the pharmacist would be lost in the process.

   d) Given the lesson in pill making and their responses to the historical problem, students will conclude that the many advantages to society produced by technological innovation will far surpass the disadvantages.

e) Given these conclusions and the brief lesson in mechanics of pill production, students will be able to develop questions concerned with such problems as: overall medical advantages derived from such means of production, where the pills will be produced and who will produce them, needs for regulating production, economic advantages to the pharmacist and how he might utilize time made available by the machine.

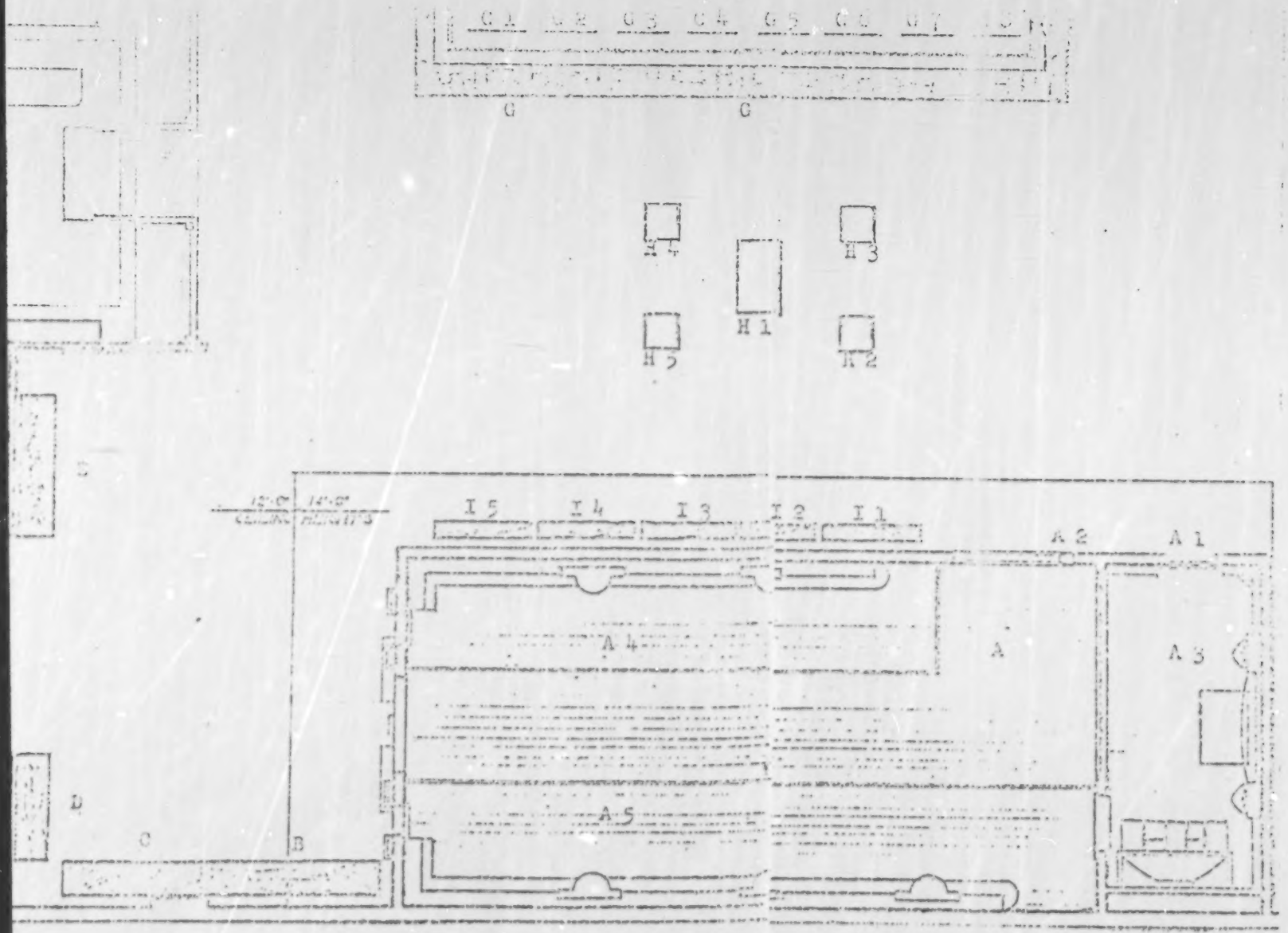
f) Given the brief introductory lesson, students will be better prepared to compare the atmosphere of the Squibb Shop with that of the 1890's U.S. Drug Store in concluding the commercial influence of technology.

APPENDIX A3

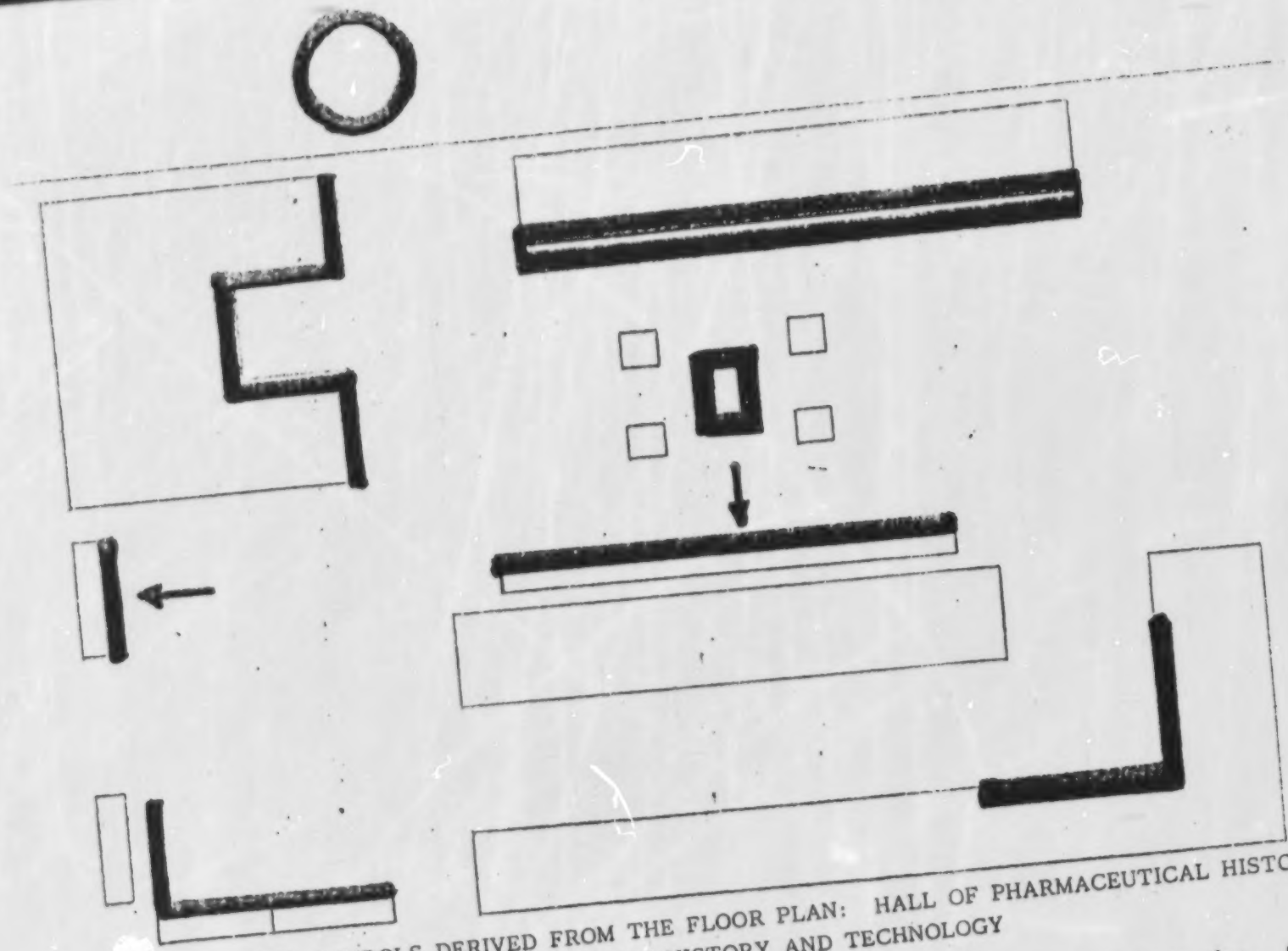
I. FLOOR PLAN OF HALL OF PHARMACEUTICAL HISTORY

II. CODING SYMBOLS DERIVED FROM FLOOR PLAN

NATIONAL MUSEUM OF HISTORY AND TECHNOLOGY



I. FLOOR PLAN: PHARMACY HALL



II. CODING SYMBOLS DERIVED FROM THE FLOOR PLAN: HALL OF PHARMACEUTICAL HISTORY
NATIONAL MUSEUM OF HISTORY AND TECHNOLOGY

Symbols used to score "group position" in this hall were derived from this simplified floor plan. Group position is described in the attachment manual in appendix A4. Information on group position is recorded under column D of the structured log of 3/73. See A4. The dark lines represent areas where school groups frequently assembled.

APPENDIX A4

I. OBSERVATION CODING SHEETS: DESCRIPTIVE & STRUCTURED LOGS

II. ATTACHMENT MANUAL FOR THE STRUCTURED LOG

OBSERVATION CODING SHEET
DESCRIPTIVE LOG 1/73

Date_____ Observer_____

School/Grade_____ Teacher_____ Page_____
Museum Tour _____ Docent _____ No.Children ____ Pre-visit preparation_____

Group Behavior						
Behavior Observed	# of children engaged in beh.	Role of ch/docent	Area	Time	Interpretation	Code

OBSERVATION CODING SHEET
STRUCTURED LOG - VERSION 1 - 2/73

School/ Grade _____ Teacher _____ Date _____ Observer _____
Museum Tour _____ Docent _____ Page _____
No.Chd. _____ Pre-visit prep. _____

Time	Docent	Attending	Non-tour specific	Responses	Group Position	Body	Discipline	Area	Code
	T/O T/G G_I I? N	D O P E I Manner Attn. OP OH OT OG OS N	S -O L W T N	#statemts. topic #questions topic	Diagram AS DS MP OD DJ A-Z PM O	S S_E L_C L_P F P	V 1 P 2 VP 3 4 5	describe	use later

KEY FOR OBSERVATION CODING SHEET 2/73
STRUCTURED LOG

TIME ELAPSED:		Record time from start of tour. This is officially in MHT 1048B.
DOCENT ACTIVITY:	T/O	Talks, focus on object.
	T/G	Talks, focus on group or individual.
	G_I	Guides group interaction.
	I_T	School instructor talks.
	$I_?$	School instructor asks question.
	N	None of the above. Try to supply some information.
ATTENDING:	D	Attention of group directed at docent.
	O	Directed at objects.
	P	Directed at peers.
	E	Directed at museum physical setting, environmental features.
	I	Directed at school instructor.
MANNER OF ATTENDING:	O_P	Children point to objects.
	O_H	Handles, manipulates objects.
	O_T	Talks about objects.
	O_G	Glances at objects.
	O_S	Studies objects.
	N	None of the above.
NON-TOUR SPECIFIC ATTENTION:	S	Sees and is distracted by the environment.
	-O	Distracted by artifacts/exhibits which are not tour related.
	L	Looks away.
	W	Walks away.
	T	Talks about non tour related topics.
	N	None of the above.
RESPONSES/STATEMENTS:	# S	Record the number of statements made. For each statement, briefly indicate the topic of the statement.
	# ?	Record the number and subject of questions asked.
GROUP POSITIONING:	AS	Apothecary Study and Shop.
	DS	1890's Drug Store.
	MP	Mortar and Pestle Display Cases.
	OD	Origin of Drugs.
	DJ	Drug Jars.
	A-Z	(Antibiotics.)
	PM	Pharmaceutical Manufacturing.
	O	Other. Describe.
BODY POSTURE:	S	Standing.
	S_E	Seated.
	L_C	Leaning on case.
	L_P	Leaning on person or people.
	F	Fighting.
	P	Pulling. Directional.
DISCIPLINE:	V	Verbal.
	P	Physical.
	VP	Both.
	1.	Adult focuses on exhibit, issues a reminder to child or group.
	2.	Takes time out to focus on child, discusses conduct.
	3.	Is agitated, uses stronger tone to admonish, scold child.
	4.	Expresses anger and frustration. No longer focused on museum or other people in group.
	5.	Extremely angry. Employs drastic disciplinary measures. Loss of verbal and/or emotional control.

SCHOOL _____ TEACHER _____ OBSERVATION CODING SHEET PAGE

SUBJECT _____ DATE

EXPERIENCE/DOCENT _____ NO. IN GROUP _____ STRUCTURED LOG, REVISED 3/73 OBSERV

PHYSICAL DIMENSIONS				SOCIAL INTERACTION WITH DOCENT						
A TIME ELAPSED	B AREA	C ATTENTION TO ENVIRONMENT	D GROUP POSITION/MAP	E DOCENT ACTIVITY	F TOUR-SPECIFIC ATTENTION	G MANNER OF MUTUAL ATTENTION	H NON-TOUR SPECIFIC ATTENTION	I MANNER OF DISTRACTION	J RESPONSE	B PO
	1.R_1 L 2.R_1 D 3.R_2 4.AS 5.DS 0.Other	1.Sound 2.Light 3.Structure/ Archt. 4.Space/Loc. 5.Mechanical 6.Can't detm. 0.Other 0/None	1. AS 2. DS 3. Mort./pest. 4. Drug jars 5. Orig. drugs 6. Manufact. 7. Antibiotics 8. Tubs 9. R_2 0. Other	1.Talk a.Focus on artifact/ history b.Focus on group/indi-vidual 2.Ask ? a.draws fr. grps. out-side exper. b.draws fr. museum con-tent 3.Passive a.waits b.withdraws 4.Use visual, olfactory, tactile ref. 5.Story 6.Demonstrate 7.Respond to signal 0.Other	1.Docent 2.Artifacts 3.Peers 4.Teacher 5.Museum Environ-ment 0.Other 0/None	1.Point/reach/ learn 2.Touch/handle 3.Follow 4.Vocalize 5.Glance 6.Prolonged looking 7.Smile 8.Other 0/None	1.Instructor 2.Artifacts 3.Peers/vis-itors 4.Environment 0.Other 0/None	1.Look away 2.Walk away 3.Blank 4.Talk 5.Play 6.Use of non-tour specific environ-ment 7.Active explora-tion 0.Other 0/None	1.Con.Dis Ask ? 2.Add infor. a.per-sonl b.tour c.tech-nology d.med. e.mus'. 3.Inte-grate 4.Suggest other act'y. 5.Imitate 0.Other 0/None	1. 2. 3. 4 4. 5. 0.

TEACHER _____ OBSERVATION CODING SHEET PAGE NO. _____

NO. IN GROUP _____ STRUCTURED LOG, REVISED 3/73 DATE _____

OBSERVER _____

SOCIAL INTERACTION WITH DOCENT								WITH O.ADLTS
D GROUP POSITION/MAP	E DOCENT ACTIVITY	F TOUR-SPECIFIC ATTENTION	G MANNER OF MUTUAL ATTENTION	H NON-TOUR SPECIFIC ATTENTION	I MANNER OF DISTRACTION	J RESPONSE	K B O D'Y POSTURE	L ENGAGEMENT WITH OTHER ADULTS
1. ⌐ AS 2. ⌐ DS 3. ▫ Mort./pest. 4. ⊤ Drug jars 5. →| Orig. drugs 6. ▭ Manufact. 7. ⌐ Antibiotics 8. o Tubs 9. ▫ ▭ R_2 0. Other	1.Talk a.Focus on artifact/ history b.Focus on group/indi-vidual 2.Ask ? a.draws fr. grps. out-side exper. b.draws fr. museum con-tent 3.Passive a.waits b.withdraws 4.Use visual, olfactory, tactile ref. 5.Story 6.Demonstrate 7.Respond to signal 0.Other	1.Docent 2.Artifacts 3.Peers 4.Teacher 5.Museum Environ-ment 0.Other 0/None	1.Point/reach/ learn 2.Touch/handle 3.Follow 4.Vocalize 5.Glance 6.Prolonged looking 7.Smile 8.Other 0/None	1.Instructor 2.Artifacts 3.Peers/vis-itors 4.Environment 0.Other 0/None	1.Look away 2.Walk away 3.Blank 4.Talk 5.Play 6.Use of non-tour specific environ-ment 7.Active explora-tion 0.Other 0/None	1.Con.Dis Ask ? 2.Add infor. a.per-sonl b.tour c.tech-nology d.med. e.mus', 3.Inte-grate 4.Suggest other act'y. 5.Imitate 0.Other 0/None	1.Stand 2.Sit 3.Lean/ rest/ 4 str'ch a.case b.people 4.Move/ fight, jump. fidget 5.Slump 0.Other	1.Volun-teer/ show 2.Seek assist. 3.Prohibit inv't. 4.Disci-pline by adult V.Verbal P.Phys. VP.Both L.Level-1)-5) 5.Rec. di-rection 0.Other 0/None

APPENDIX A4

II. ATTACHMENT MANUAL FOR THE STRUCTURED LOG

MARCH, 1974

PHYSICAL DIMENSIONS

COLUMN A - TIME ELASPED

Museum Tour: Duration one hour.

Observer: Record the time elasped.

COLUMN B - AREA

Museum Tour:

1. Group normally visits the MHT rectangular classroom 1048-B, the Apothecary Shop and Study, and the Drug Store.
2. Sometimes, a variety of adjacent health exhibits will also be visited. Code 0 should be used for these areas.

Observer:

Record group/individual in:

1.	R_1 L	Rectangular classroom, docent lectures to group.
2.	R_1 D	Rectangular classroom, docent demonstrates artifacts.
3.	R_2	Rectangular classroom, group laboratory.
4.	AS	Apothecary Shop and Study.
5.	DS	Drug Store.
0.		Other - describe briefly.

COLUMN C - ATTENTION TO ENVIRONMENT

Museum Tour:

Individual children or groups may verbally and/or physically focus on the physical setting of the museum. We see them looking trying to identify the source of attraction. They will sometimes share their discovery with peers.

Observer:

Look for evidence of what is in their line of vision. Physical aspects of the museum, eliciting attention, are coded in this column.

1. Sound (mechanical or human).
2. Light (special effects, changing patterns, etc.).
3. Architectural structure (design).
4. Space (height, intimacy, size).
5. Mechanical devices (elevators, drinking fountains, escalators, etc.).
6. Can't determine.
0. Other.
0/None.

Score conservatively using code 6 unless there is clear evidence for scoring codes 1-5.

COLUMN D - GROUP POSITION/MAP

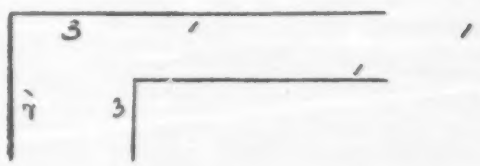
Museum Tour:

Group clusters and exhibit types are designated under this column.

Observer:

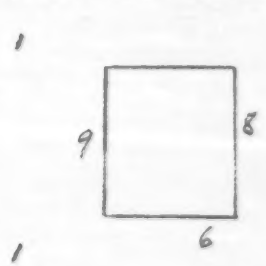
Record the number of children in a cluster and their approximate location in relation to a specific exhibit.

1. Apothecary Shop and Study.



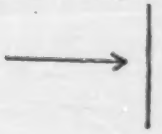
2. Drug Store.

3. Mortars and Pestles.

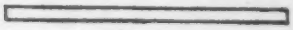


4. Drug Jars.

5. Origins of Drugs.



6. Pharmaceutical Manufacturing.



7. Display of Antibiotics from A-Z.

8. Surgical Tubs.

9. Rectangular Room. Demonstration/Laboratory.

0. Other.

SOCIAL INTERACTION WITH DOCENT

COLUMN E - DOCENT ACTIVITY

Docents vary according to their styles of presentation and demonstration, manner of handling group interest, experience, personality, etc.

Observer:

Record docent activity.

1. Talk
   a. Focus on artifact or historical fact. Eyes on inanimate objects.
   b. Eyes on group or individual.
2. Ask Question
   a. Draws from museum content. She asks questions that may be answered by looking at exhibits.
   b. Draws from group pre-museum visit experience. Questions may not be answered by material visible to them.
3. Be passive rather than dominant
   a. Waits for group to see, notice something. Pauses.
   b. Withdraws from discussion, asks another opinion from group.

4. Suggest visual, olfactory, tactile, or auditory investigation.

5. Use a story to describe principles, history, technological developments, etc.

6. Demonstrate use of an artifact.

   Docent handles artifact in a manner which illustrates its operational features.

   a. Record if artifact is within reach or view of child (approx. 3').

      Kinesphere is the spherical "reach" range of the user, where there occurs the more personal confrontations of the user by outside elements.

   b. Record if artifact is contained in a period room remote from child (approx. 12').

      Distal Distance is the spacial limit surrounding the user where the social and environmental elements begin to have more prolonged effects upon the user behavior. (Frost, 1973).

7. Respond to distress signal or attention getting signal from child.

   Special attention may be given to one child.

0. Other.

COLUMN F - TOUR-SPECIFIC ATTENTION

If group attends to tour related matter, specify where attention is.

Observer:

Record attention fixed on:

1. Docent.
2. Artifact.
3. Peers. Discussion may occur where two or more children show interest in tour related material but do not attend to artifacts chosen by docent.
4. Teacher. Children may go to teacher to show, tell, or ask something.
5. Museum Environment. Children may attend to tour related environments or exhibits. The docent may not be discussing them with the group.

0. Other.

0/None.

COLUMN G - MANNER OF MUTUAL ATTENTION

While the docent is active (See Column E), the children respond to her guidance by facing towards her, artifact, or exhibit. Social exchanges are characterized by an element of participation or mutuality between child and docent, child and artifact, or child and exhibit.

Observer:

Record the various group responses.

1. Point, reach, lean. Child may lean over in chair or stand for a better view. A nose, hand, arm or leg may lead.
2. Touch and handle. This refers to contact or manipulation of exhibit case or artifact.
3. Follow. The group may locomote or shift, moving towards the docent or the artifact she is discussing. Distance may be decreased. Docent may ask group to lie on floor for a different perspective.
4. Vocalize. Children express pleasure, displeasure, awe by using squeals and other sounds such as "eughh" while looking at artifact, etc.
5. Glance. Children may look around a period room, scanning the whole environment. Hunting for clues, artifacts, or new discoveries. They are seen panning the area.
6. Prolonged looking. This suggests more concentration and focus than #5. Time elasped should exceed 10 seconds. Head may move but if shoulders

or body movement are involved, we should consider this a new interest. Sighting is static, whereas glancing is a dynamic activity. If person returns to the same artifact after being distracted or after looking at another object, we may still consider this prolonged looking. Indicate interruption by coding 6 i and duration of digression.

7. Smile. Facial expressions often follow group/docent discussions.

0. Other.

0/None.

COLUMN H - NON-TOUR SPECIFIC ATTENTION

Children not paying attention to the docent, tour content or tour related exhibit materials are recorded in Column H.

Observer:

Record non-tour specific attention as a distraction by:

1. Instructor or other accompanying adults (parents, bus drivers, etc.).
2. NTS artifacts or other exhibits.
3. Peers or museum visitors.
4. NTS environment.
0. Other. (If non productive behavior is stimulated by something concrete, record).

0/None.

COLUMN I - MANNER OF DISTRACTION

If group is distracted by non-tour related matter, what behaviors are involved? Observer must have a strong intuitive impression that child is distracted.

Observer:

Record:

1. Look away from group, docent, artifact or exhibit case.
2. Walk or break away from group, docent, artifact or exhibit case.
3. Blank expression indicates non attentiveness. Child is no longer part of a social environment. Averts visual contact.
4. Talk with peers, visitors, instructor about non-tour specific topics. Child may be amusing self and others.
5. Play. This is aimless behavior and must be distinguished from productive examination. Child may hide behind a display case.
6. Use of non-tour specific environment.
7. Active exploration, examination of NTS matter. This may be differentiated from #1, in that child is involved in a task, not just looking around. He may be listening to an audio device and pushing buttons in another area.

0. Other.

0/None.

COLUMN J - RESPONSES

The nature of responses and the frequency of responses is of interest to us.

Observer:

Record responses from child if it serves to:

1. Continue discussion. Asking a question is one way that a child may continue focus on the topic. Give and take occurs between members of the group.
2. Contribute or exchange information. Is the information:
   a. From a personal experience?
   b. About the logistics of the tour?
   c. Concerned with technological aspects of the tour subject?
   d. Related to medical issues?
   e. About the museum and its role in portraying the subject?
3. Integrate information.
4. Suggest interest in other medical activities.
5. Imitate docent.

0. Other.

0/None.

COLUMN K - BODY POSTURE

Group posture may be an indication of fatigue, interest, boredom, discomfort, need for activity, etc.

Observer:

Record body posture as:

1. Stand. Groups touring the museum are most frequently asked to stand and look.
2. Sit.
3. Lean/rest/stretch on:
   a. Case.
   b. People. This is different from Column G, item 1 in that this body posture involves a case or person.
4. Move limbs and/or body:
   a. Fighting.
   b. Jumping.
   c. Fidgeting.
5. Slump. Center of gravity changes. Discomfort may result from wearing overcoats indoors.

0. Other.

SOCIAL INTERACTION WITH OTHER ADULTS

COLUMN L - ENGAGEMENT

Children may interact with: (a) teacher, (b) parents, and (c) other adults accompanying group. Record the existence of all persons in group by (a), (b), and (c).

Observer:

Record children as they:

1. Volunteer information or show object to adult. Adult need not perceive initiatives or respond to them in order for them to be scored.
2. Seek assistance. Child may fret and then seek help.
3. Prohibit involvement. Child may want adult attention in task, but not adult's physical involvement. Adult may remove an object from the child with or without explanation.
4. Are disciplined by adult. Indicate form of discipline: V for Verbal, P for Physical or VP for both. The levels of intensity of discipline are defined by the following adult actions:
   a. Issues a quick remonstrance.

b. Takes time out to talk to child. Explains that action is not proper and should not continue. Flow of tour is not affected.

c. Uses stronger tone to admonish child. Tone of voice reflects irritation or displeasure. This act physically interrupts the flow of the visit.

d. Expresses anger by hitting, slapping or dragging child.

e. Loses control or tolerance. Productivity of museum visit is ended if adult loses total composure.

5. Receive direction. Adult issue instructions or commands.

0. Other.

0/None.

APPENDIX A5

A SAMPLE OF RESPONSES GROUPED IN CRITERION BEHAVIOR CATEGORIES

DATA FROM THE DESCRIPTIVE LOGS

VERIFICATION

Behavior Observed	Interpretive Comments	Area
They report in excited fashion on large mortar and pestle in back area of Drug Store.	Do students recall mortar and pestle with more interest because they have had previous work experience with mortar and pestle? Can they imagine effort involved in working with large floor model?	DS
"Oh, there's a tablet press, drug mill and pill machine."	Verification of the existence of things he's seen in classroom. These are additional varieties of tools.	H
Students are seated on bench - look at store front. They move to point out things in Drug Store - move toward store.	This group positioning prevented close contact and examination of objects of interest. Anxious to look more closely at properties of artifacts.	DS
They notice that the mortar and pestle shape is repeated in large Tiffany glass RX.	The shape is a property of the mortar and pestle which drug store used to advertise its existence.	DS
"This wooden one works pretty good." "I figured out how it works, hold the handle like this." Puts effort into mortar and pestle activity. He moves hand lower and grips pestle firmly. "Chipper, here try this one."	They interact with each other, offering different mortars and pestles to each other. They suggest to others that they test the operation of mortar and pestle.	R2
"The big one works best, that's why I stole it." He works furiously at grinding.	Comparison of different mortars and pestles. Docent did not suggest this, They verify properties and characteristics.	R2

VERIFICATION

Behavior Observed	Interpretive Comments	Area
Girl reaches into mortar and pestle as it's being circulated to touch grinds. She may feel how coarse materials are. School teacher at this point says, "don't touch."	Teacher training necessary. Child confirms the texture of grinds which have not been ground as finely as machine grinds.	R1
"Are these original?" "Wow, they're original." "Look at that," (He reads on grinder.) (Grinder in classroom.) "1873"	Impressed with age of artifact. Most students know museums have original objects; nevertheless, they express surprise at the age of artifact.	R2
Before docent finishes talking, ten students move toward table to work.	Eagerness. Readiness to tackle task and examine properties for themselves.	R1

DISCOVERY

Behavior Observed	Interpretive Comments	Area
Docent said,"Why was this pill tile used as a diploma by the early apothecary? Students respond," Paper was scarce. The tile had more use than a piece of paper. You couldn't forge this easily. It acted as a sign to advertise the shop."	The students in docent led tours were able to come up with many new ideas about pill tiles after seeing one demonstrated in the R_1.	R_1
Docent demonstrated pill roller machine. Students were absorbed. Some had their hands resting on hips, mouths limp, eyes fixed on her hands. Little blinking occurred. As she finished producing the pills, she passed the roller around to show results. Many students rise out of seats for a better view.	Demonstration is a powerful device for children in a museum setting. Students enjoy discovering how things work. They are eager to see the finished product.	R_1
Students said they expected to see the apothecary shop, but didn't expect to see the apothecary's study with the dead animals. They are also surprised to see the large mortar and pestles. The discovery about the mortars and pestles was their use for roots and bark for medicinal ingredients.	They weren't prepared to see such an extensive working room in the museum. They are careful lookers, examining the artifacts and the entire setting. Much conversation is begun in AS.	AS
Docents said animals were not practiced on as medical-surgical subjects when the child made this statement. In fact, the animals served as a public relations message that pure ingredients were used.	Docent supplies correct information when the child "discovers" incorrect information. She has extended the child's knowledge.	AS
Child says the skull must have symbolized the brain. Again, the docent corrected the child and stated that the skull is intended to convey a message of the transitory nature of life and the hereafter.	Misunderstanding contents often occurs in the museum. Sometimes the first answer of a child is not well thought out. He needs assistance in learning how to think about other more reasonable options to puzzling content.	AS
At the back door to the DS, about eight children try to see into the Study of the DS. They notice: glass stoppers; labels; printed matter on metal containers; fancy light fixtures, gas or electric fixtures; pill boxes; and the absence of church related artifacts.	Students identified all these artifacts and asked about them. These may point to questions which could be answered in the classroom. They continue to discover in a new setting after seeing the front of the DS.	DS

DISCOVERY

Behavior Observed	Interpretive Comments	Area
Child says, "What?" Raising questions about new information just heard. Group repeats information and expresses discomfort through sound and body shrinking.	Docent says, "In the past, the barber performed the necessary surgery." Children respond physically to this information which surprises them.	R1
Students approach teacher and other adults (myself and docent) saying, "There should be a law against showing us photos." When student was asked which photos, he eagerly escorted the adults to the anatomy area, saying, "Here." Excitation, quickened pace, facial delight, are part of their expressiveness.	Students discovered an area re- to health care and were shocked by what they saw - photos of patients with repaired hare lip, facial congenital deformities, abnormal features. Students remained in this area for 10-15 minutes making new discoveries from the exhibit content with the docent who had previous training as a nurse.	Anat.
Docent says, "Find some things you didn't expect to find in this apothecary study." Group not disturbed about being crowded, shifts, attempts to see better.	Dimly lit period room. Students move as they try to examine unfamiliar objects. They are paying attention to the search. Casual visitors may be discouraged by darkness and leave without paying attention.	AS
Students make gut sound, "uehh." They learn that drugs were mixed with alcohol and wine to bind them together.	Expressiveness indicating that they've been impressed with information that they did not have before they came into the museum. If information is old hat, they tell docent, "Oh, I knew that before." (My experience.)	R1
Students say," Oh, look there's a bladder in the drawer. It says so on the label."	They have been paying attention to detail in a darkened area of the AS. They confirm (verify) their discovery by reading the small label on the drawer. Their discovery is that the apothecary kept bladders and other strange items in the shop.	AS

INTEGRATION

Behavior Observed	Interpretive Comments	Area
Docent presents group with a simple question, "What changes have occurred in the society between the time of the apothecary and the Drug Store?" Students discuss at some length the changes which centered around some of the following: more advertising-more clients. companies developed-more communication and some reason to work together. pills in larger quantities-mass production sets in. people richer-machines help. people read-more emphasis on knowledge. environment is cleaner-cleanliness and scientific awareness are linked. diplomas on wall-authority of pharmacist. many other things are sold in the DS.- more time for expansion of interests.	Good question which many children could contribute to. Docent must stay on the topic and pusue the reason that the child brings up a topic. Statements are not always immediately clear, especially when there are 30 children responding simultaneously. Management under such circumstances is necessary.	DS
Laughter and response to a docent question. "No, it doesn't look like a Drug Fair or People's Drug Store." They begin to look at and point to artifacts which they are familiar with but certainly are not found in the modern drug-discount chain stores. They point to scale and recipe books.	Amused at docent's question. Discussion in this area is facilitated by artifacts. They are able to consider an environment which is not in the museum(the drug store chain). They are interested in discussing it because of the fact that they can point to things which are not to be found in the modern drug store.	DS

INTEGRATION

Behavior Observed	Interpretive Comments	Area
"I didn't know they had electricity back then."	Child is responding to the Tiffany Lamp. The 1890 world is opened for discussion. This artifact looks colorful for the child and perhaps stimulated a discussion about the power source. Also, the dimness of the AS is remembered. The children have been told to compare the atmosphere of the two settings. If incorrect information has been assumed, the docent can hear it.	R2
"If no one could read or write how come there's a book in there?'	They have combined two facts. One fact was heard and the other was seen in the exhibit. This is also a critical observation since the book relates to the concept of standardization. The book is for recipes.	AS
Docent says,"What do you see?" She may go further and say,"Do you see the groove?" Children yell," It's for a belt, for an engine. It saves time and is cheaper in the long run."	They examine and analyze the detail of an artifact and have drawn a number of conclusions. It is a coherent experience.	R1
Docent says,"What is different in America now?" "How can we tell from looking at the period room?" Children say,"We can read now." They point to proof of their comment.	This type of discussion continues and other differences are mentioned. They are able to attend to the exhibit and select from among 2000 objects some which tell the story they are after.	DS
"This wooden mortar and pestle were used in a domestic setting cause they're lighter."	Working with the actual mortars and pestles help the students to observe how they feel different and how they could have had different uses. The artifact led to integration.	R2
Docent asks," What happens when you have a metal mortar and a metal pestle?" The child says when two were in contact, in rubbing, there were sparks, flakes of metal and consequently impurities in the pill ingredients.	This crude grinding method may have created impure, non standardized pills. Health care may have been adversely affected by this type of occurrence unless the apothecary was aware that precision and cleanliness was essential in pill manufacture. The question of improved technological capabilities arose and the scientist becomes important.	R2

RESPONSES GROUPED ACCORDING TO THE CRITERION BEHAVIOR CATEGORIES

KT

1. Behavior Observed - This occurred at different times in the tour and was recorded in descriptive log form. Behaviors of child and docent are sometimes relevant.

2. Interpretive Comments-After each tour, the observer reviewed the collected responses and recorded information which elaborated upon the behavior. This is useful in discussions with other researchers who can assist in analyzing data. The behavior may also be judged as an important dimension of the criterion behavior categories. The context of the behavior is also important for review purposes.

3. Tour Sections - R1 - Rectangular room, first 15 minute section.
R2 - Rectangular room, second 15 minute section.
AS - 16th - 18th century European Apothecary Shop and Study.
DS - 1890 U.S. Drug Store, fourth 15 minute section of the tour.

APPENDIX A6

CHARTS

GRAPH DATA FROM THE DESCRIPTIVE LOGS & STRUCTURED LOGS

GRAPH DESIGNS BY ANN ROSSILLI

OFFICE OF EXHIBITS CENTRAL

SMITHSONIAN INSTITUTION

WASHINGTON, D. C.

CHARTS

GRAPH DATA FROM THE DESCRIPTIVE LOGS & STRUCTURED LOGS

JEAN CHEN, LEARNING RESEARCH SPECIALIST
PSYCHOLOGICAL AND SOCIOLOGICAL STUDIES PROGRAM
OFFICE OF MUSEUM PROGRAMS
SMITHSONIAN INSTITUTION
WASHINGTON, D. C. 20560

REVISED FEBRUARY, 1974

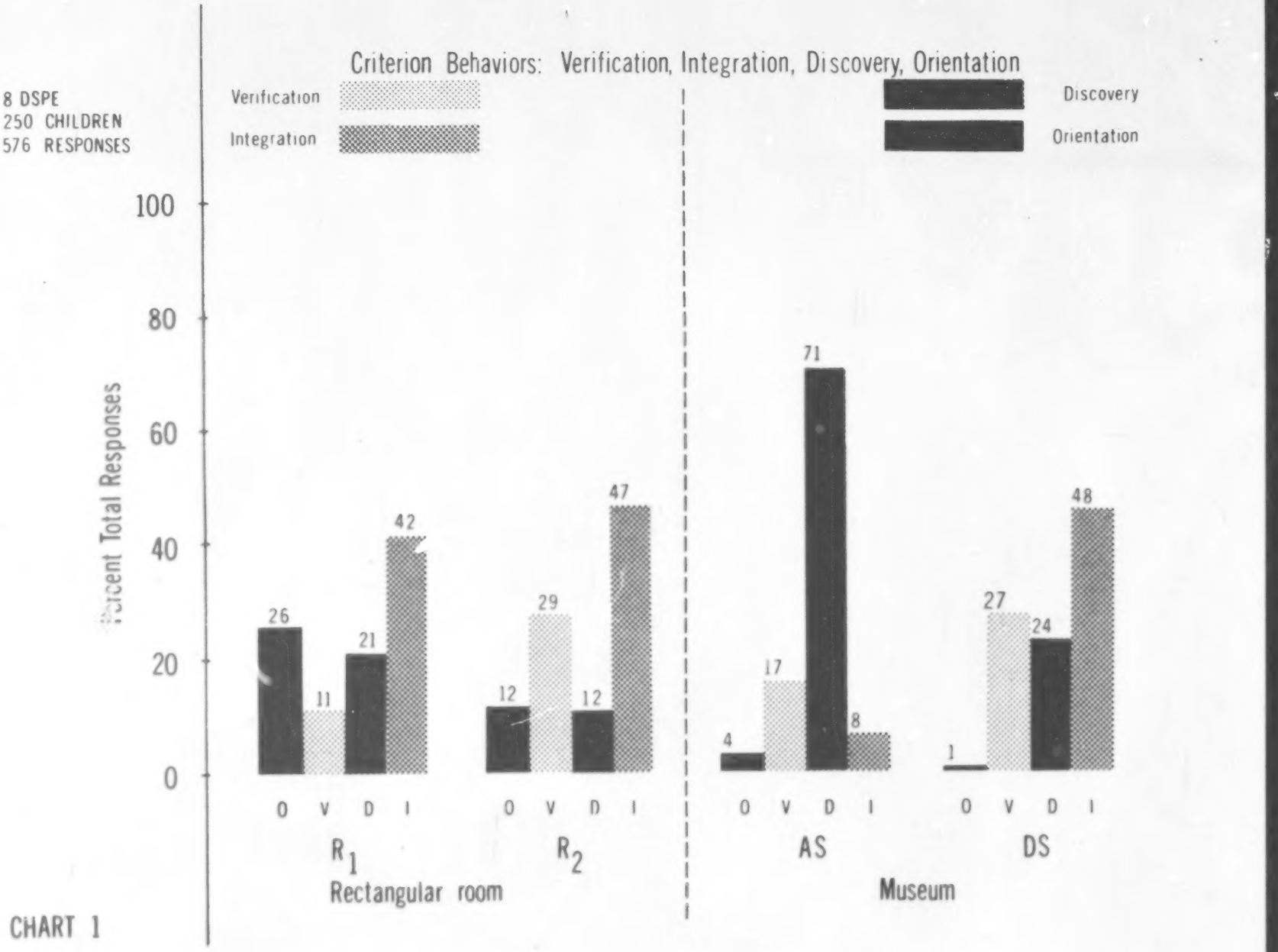

8 DSPE
250 CHILDREN
576 RESPONSES
Criterion Behaviors: Verification, Integration, Discovery, Orientation
Verification
Integration
Discovery
Orientation
Percent Total Responses
100
80
60
40
20
0
26
11
21
42
12
29
12
47
4
17
71
8
1
27
24
48
O V D I
R_1
R_2
Rectangular room
AS
DS
Museum

CHART 1

8 DSPE-DL

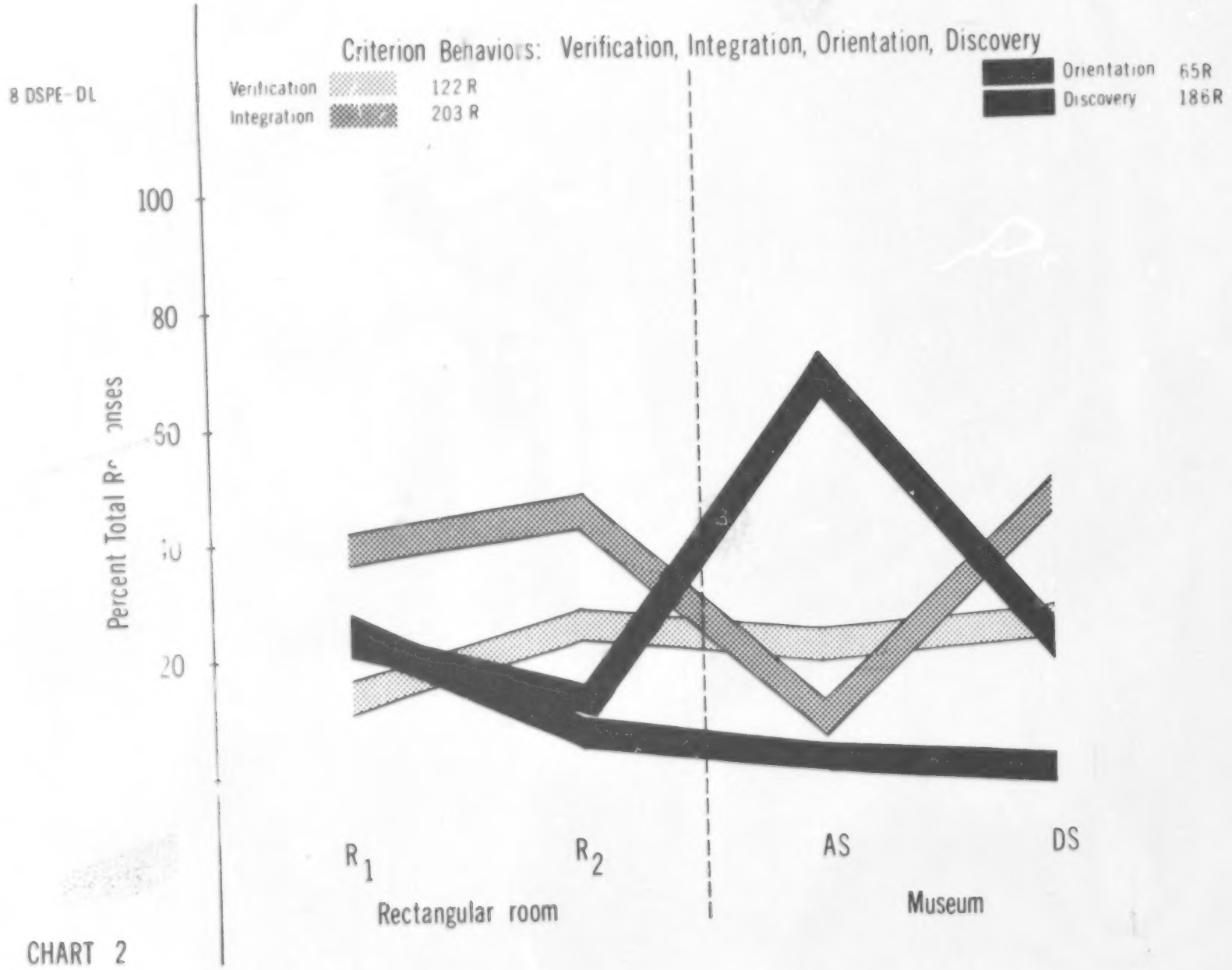


CHART 2

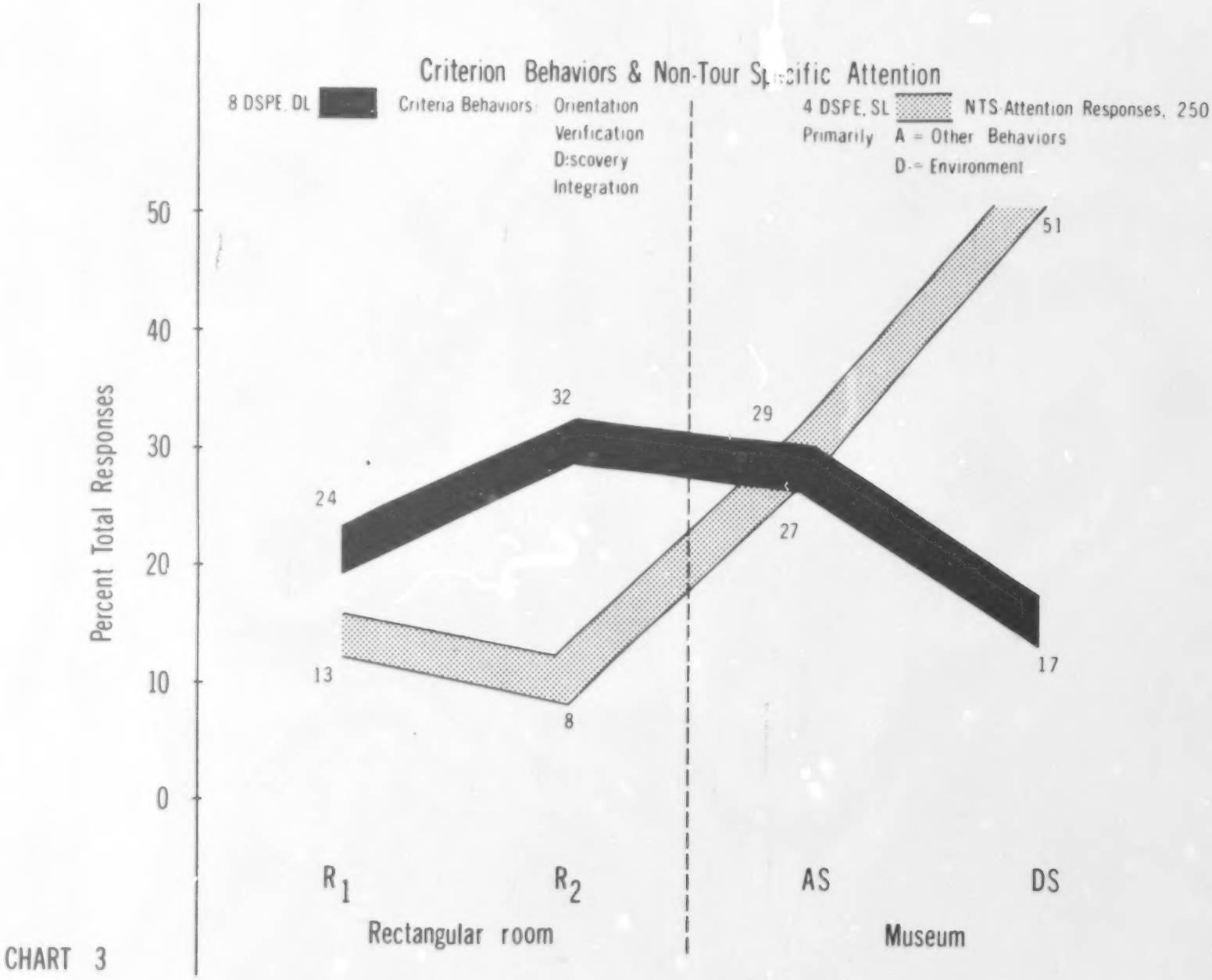

Criterion Behaviors & Non-Tour Specific Attention
8 DSPE. DL
Criteria Behaviors
Orientation
Verification
Discovery
Integration
4 DSPE. SL
NTS Attention Responses. 250
Primarily
A = Other Behaviors
D = Environment
Percent Total Responses
50
40
30
20
10
0
32
29
24
27
13
8
51
17
R1
R2
AS
DS
Rectangular room
Museum

CHART 3

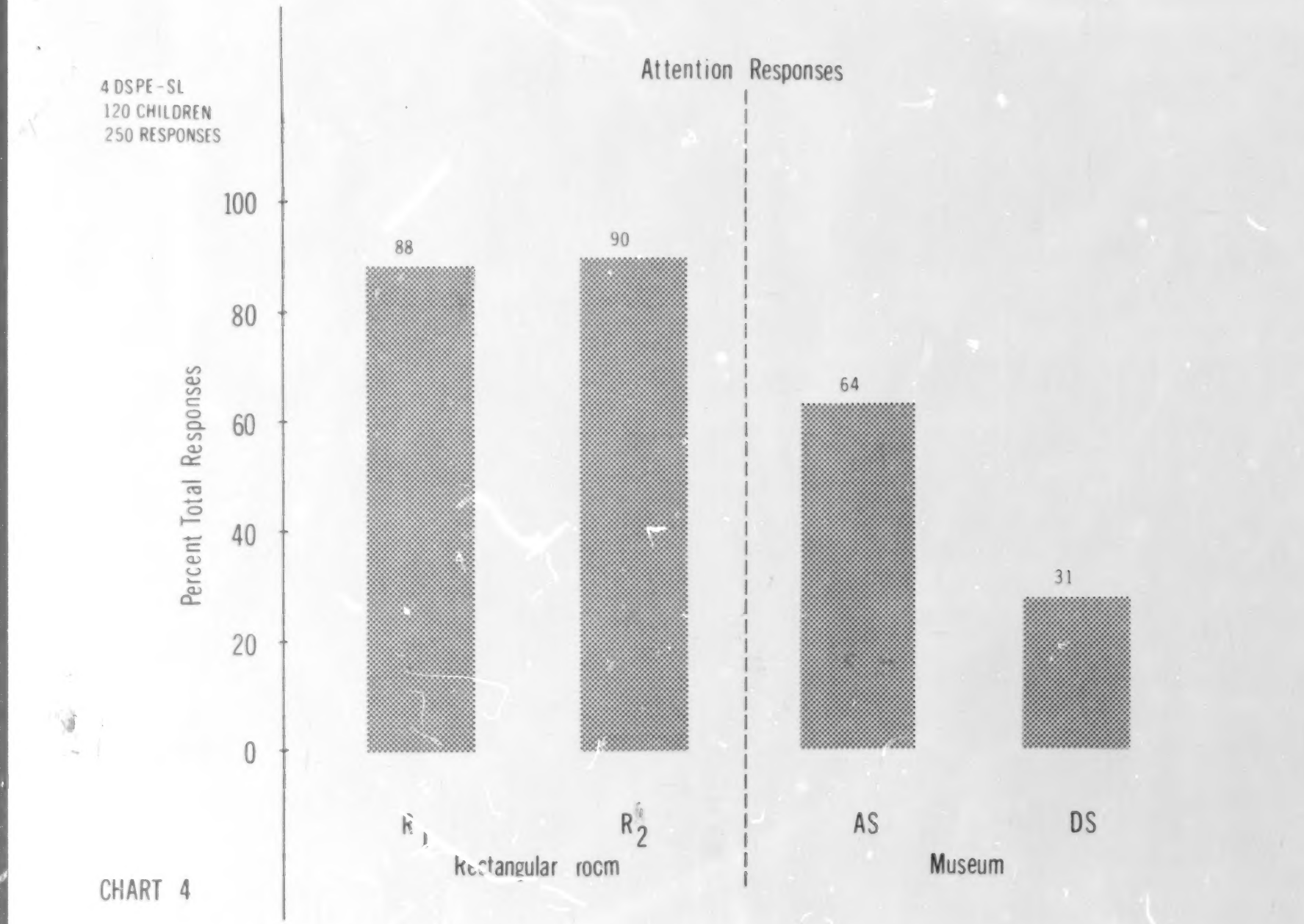

4 DSPE-SL
120 CHILDREN
250 RESPONSES
Attention Responses
Percent Total Responses
100
80
60
40
20
0
88
90
64
31
R1
R2
AS
DS
Rectangular room
Museum

CHART 4

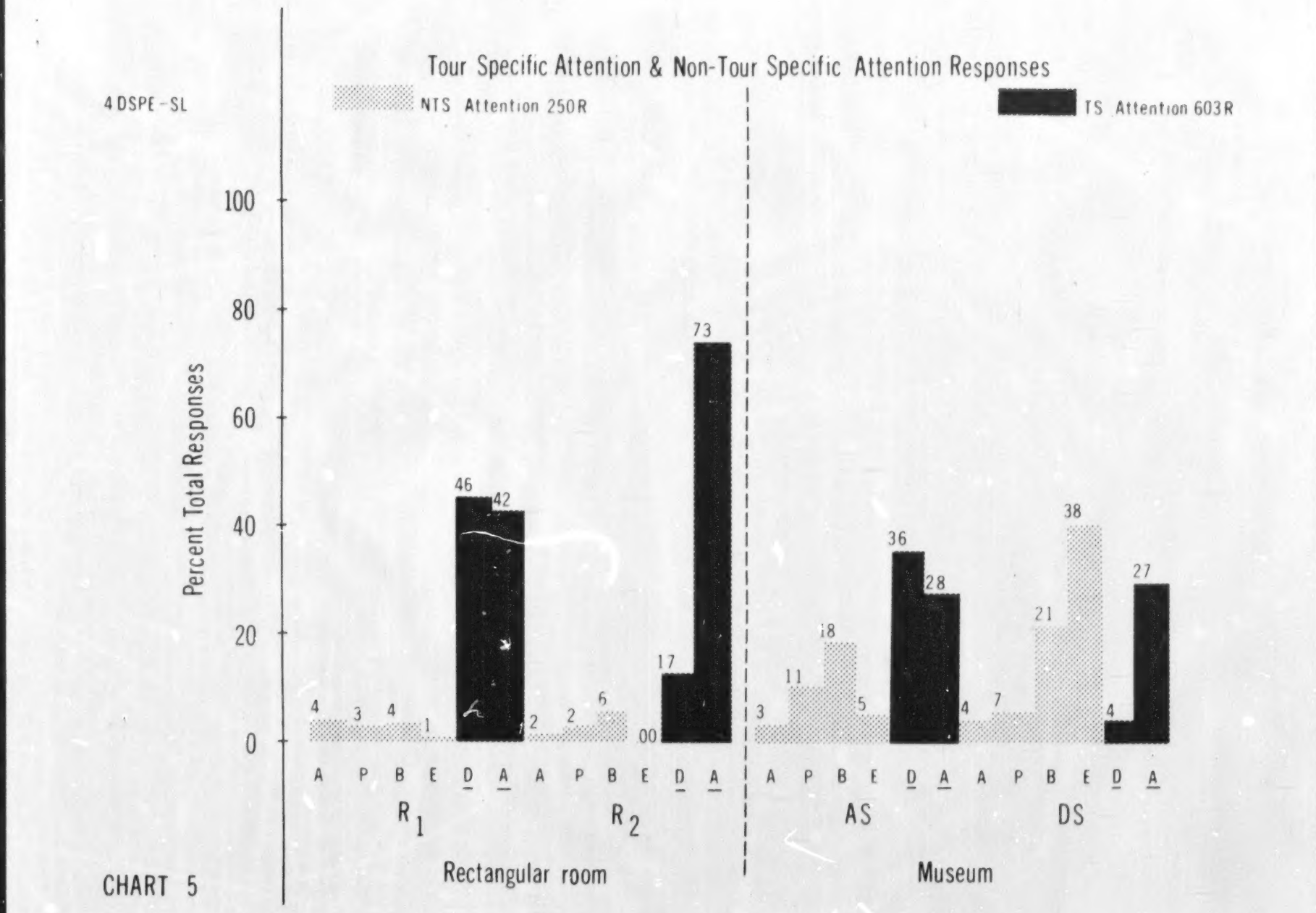

4 DSPE - SL
Tour Specific Attention & Non-Tour Specific Attention Responses
NTS Attention 250R
TS Attention 603R
Percent Total Responses
100
80
60
40
20
0
4 3 4 1 46 42 2 2 6 00 17 73
3 11 18 5 36 28 4 7 21 38 4 27
A P B E D A A P B E D A
A P B E D A A P B E D A
R1
R2
AS
DS
Rectangular room
Museum

CHART 5

KEY TO CHARTS

DSPE THE DOCENT STRUCTURED PHARMACY EXPERIENCE (DOCENT GUIDED TOUR) IN FOUR SECTIONS:

R_1 - Rectangular room, section 1, a lecture and demonstration.
R_2 - Rectangular room, section 2, a practical laboratory time for experimentation.
AS - Apothecary Study and Shop, section 3, a 16th-18th century environment.
DS - United States Drug Store, section 4, a 19th century environment.

OBSERVATIONAL DATA WAS RECORDED IN TWO FORMS:

DL - Descriptive Logs.
SL - Structured Logs.

R - Number of responses collected is given on charts.

CRITERION BEHAVIORS:

O - Orientation.
V - Verification.
D - Discovery.
I - Integration.

TOUR-SPECIFIC ATTENTION RESPONSES (TS) :

$\underline{D}$ - Attention directed to docent.
$\underline{A}$ - Attention directed to tour related artifacts.

NON- TOUR SPECIFIC ATTENTION RESPONSES (NTS) :

-A - Distracted from tour related content by artifacts.
B - Non-productive behaviors.
E - Distracted by museum environment.
P - Distracted by peers/visitors.

APPENDIX A7

Subsequent presentations of the research efforts were made at a gathering of educators at the National Collection of Fine Arts, Smithsonian Institution, Washington, D. C., August 1973; the Annual Conference of the American Association for State and Local History in Edmonton, Canada, September 1973; Docent Training Sessions at the Smithsonian Institution, October 1973 and January 1974; the Arts and Humanities Lecture Series, the College Accelerated Program, Hahnemann Medical College in Philadelphia, Pennsylvania, November 1973; and the Office of Museum Programs - George Washington University Seminar, Smithsonian Institution, February 1974.

Presentations are scheduled for the Annual Conference of the American Educational Research Association, Chicago, Illinois, April 1974 and a Museum Training Workshop, Smithsonian Institution, April 1974.

APPENDIX B

DESIGNS FOR A FUTURE STUDY

ILLUSTRATIONS BY JAMES SPEIGHT

OFFICE OF EXHIBITS CENTRAL

SMITHSONIAN INSTITUTION

WASHINGTON, D. C.

APPENDIX B1

A PRE AND POST TEST DISPLAY CASE UNIT

APPENDIX B2

A RESEARCH INFORMATION STATION

A wall unit could be designed to serve as a communications and training device for docents. Basically, bulletin boards, a storage file cabinet, and a lighted display case are needed for the construction of this station. It would organize events and needs as follows:

PROCESS: Where current explanations of efforts and the process of developing behavior based interface techniques are available for all docents and interested museum professionals.

FEEDBACK AND INTERPRETATION: Where docent responses are noted for future discussions. This is important when incompatible docent and researcher schedules prohibit immediate exchange.

SCHEDULES: Where project schedules and deadlines are recorded. Equipment schedules need constant attention.

NEEDS: Where specific follow-up is checked.

RESEARCH RELATED INFORMATION: Where written articles, films, and specific ideas are available and stored for reference.

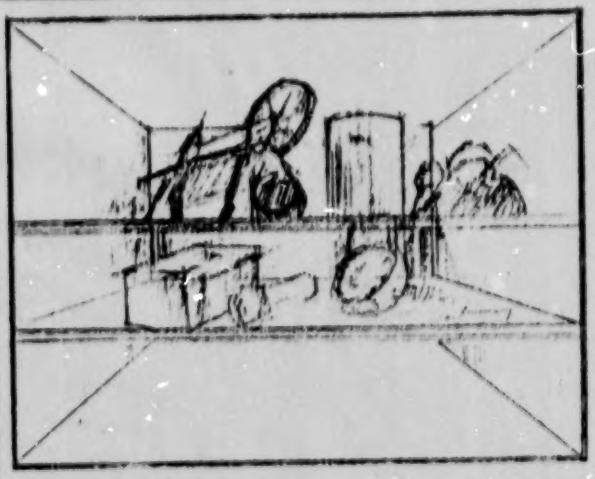
INTEGRATION TECHNIQUES

RECYCLED MATERIALS

DOCENTS

AREAS/TOURS INVOLVED MAPS

ARTIFACTS TESTED DOCENTS



RESPONSE BACKBOARD

NEED CONSULTATION

AVAILABLE FOR EXPERIMENTATION

PHOTO TECHNIQUES IN ACTION

AESTHETIC

HISTORIC

TECHNO-LOGICAL

LISTEN	WATCH	RECORD
TITLES	OF	ARTICLES

RESEACH INFORMATION STATION

Photographic Equipment	Library	Docent Documents

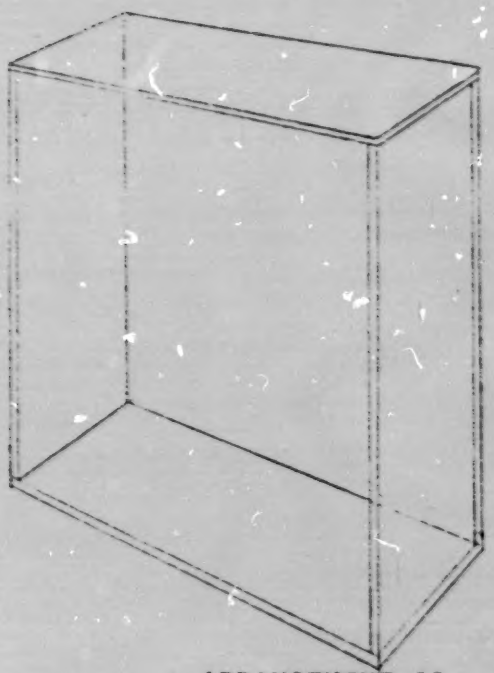
APPENDIX D

PRE AND POST TEST DISPLAY CASE UNIT

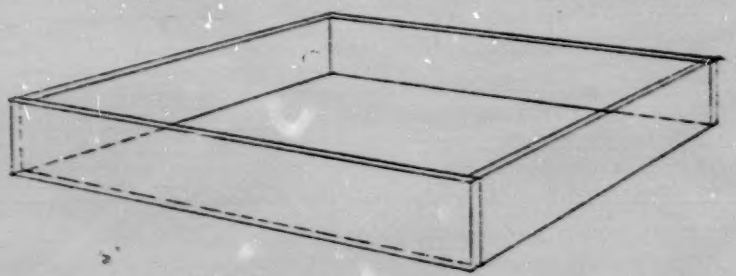
THESE SIMPLE DISPLAY CASES MAY BE BUILT OF THE FOLLOWING UNITS:

1. FIVE-SIDED PLEXIGLAS CASE
2. ONE SLAB OF PLEXIGLAS
3. THREE SHELVES

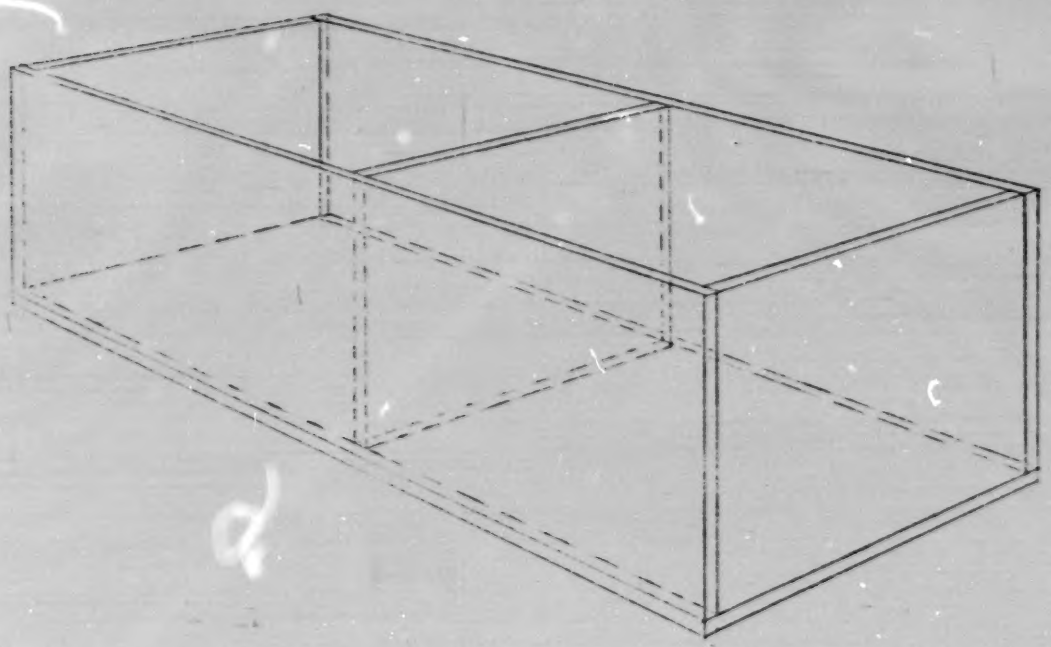
ARRANGEMENT I. c) SIX-SIDED CASE OR E) A REMOVABLE SLAB PERMITS ITS USE AS A FIVE-SIDED CASE.



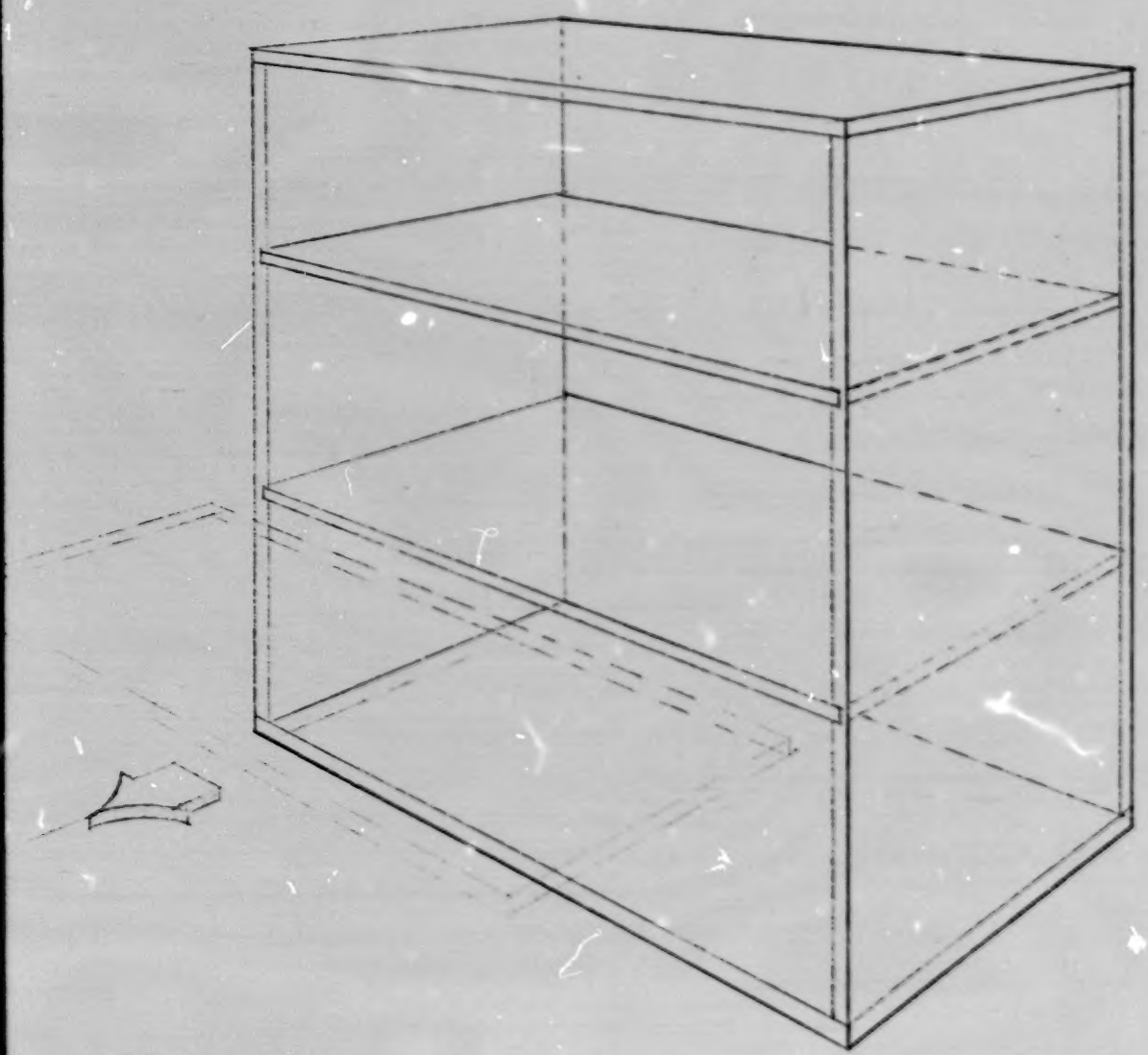
AN ARRANGEMENT OF ARTIFACTS IN THIS FIVE-SIDED CASE USING AN AERIAL PERSPECTIVE WOULD REPRESENT CASE A) OR D).



ARRANGEMENT II. FIVE-SIDED CASE WITH CENTRAL DIVIDER (SHELF). THIS AERIAL PERSPECTIVE ALSO REPRESENTS CASE A)



ARRANGEMENT III. FIVE OR SIX-SIDED CASE IN A VERTICAL POSITION WITH FRONTAL VIEW. WITH THE ADDITION OF SLIDING PLEXIGLAS SHELVES, WE HAVE ANOTHER VERSION OF DISPLAY CASE c).



ARRANGEMENT IV. HORIZONTAL DISPLAY CASE WITH FRONTAL OR AERIAL VIEW. THIS IS THE SAME AS UNIT III WITH TWO EXCEPTIONS:

ONE SHELF IS USED

THE CASE IS IN A HORIZONTAL POSITION